

SDMS Document



98435

REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN

**FIELD OPERATIONS PLAN
ROCKAWAY BOROUGH WELL FIELD SITE
OPERABLE UNIT #3
FOR PROPERTY OF
KLOCKNER & KLOCKNER
ROCKAWAY BOROUGH, NEW JERSEY**

**VOLUME 2
ENVIROTECH RESEARCH, INC.'S
QUALITY ASSURANCE MANUAL**

SUBMITTED TO:

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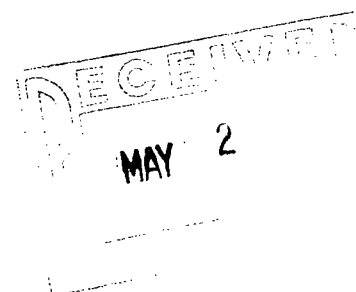
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QUALITY ASSURANCE MANUAL

ENVIROTECH RESEARCH, INC.

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ENVIROTECH RESEARCH, INC.

Introduction

The purpose of this manual is to establish quality assurance program criteria and procedures for Envirotech Research, Inc. This quality assurance program is designed to meet or exceed all routine regulatory quality assurance requirements for environmental analyses and to provide analytical results of the highest accuracy and precision.

Envirotech Research, Inc. provides analytical testing of environmental water, soil and waste samples for a variety of clients ranging from small businesses to Fortune 100 companies and government agencies. Our goal, from the company's inception, has been to be the laboratory of choice in New Jersey and the surrounding region known first and foremost for the quality of the data we produce and the service we provide. The commitment of Envirotech Research, Inc. to production of the highest quality data is reflected by our investment in the best available analytical instrumentation. Envirotech Research performs testing of a full array of sample matrices for a wide variety of organic chemicals, trace metals and conventional indicators of environmental quality.

The central concern in all aspects of sample analysis by Envirotech Research is strict adherence to quality assurance and quality control procedures, insuring data that will meet the needs of our clients. The quality of analytical results are insured through a variety of mechanisms including use of EPA published protocols and other accepted authoritative methodologies.

Environmental testing requires strict adherence to method requirements. At Envirotech Research, Inc. we have successfully applied fundamental quality assurance principles to environmental testing. Our chemists are instructed to understand analytical requirements and take corrective action the instant any method non-conformance occurs. This principle of "doing it right the first time" not only ensures a work product free of non-conformance but actually helps boost productivity. The apparent "cost" of stopping analyses periodically is far outweighed by the "benefit" of providing conforming data.

Envirotech Research's Quality Assurance Manual spells out specific requirements for procedures that are applied throughout our laboratory. In addition, our analytical Standard Operating Procedures (SOPs) document in great detail our procedures for each of the analytical methods performed at our laboratory. These analytical SOPs, consisting of thousands of pages, supplement our Quality Assurance Manual and will be provided as required on a project specific basis.

A more detailed discussion of the quality assurance and quality control procedures utilized by Envirotech Research, Inc. is provided in the following pages.

ENVIROTECH RESEARCH SOP No. S101.1
STANDARD OPERATING PROCEDURE
FOR SAMPLE CONTAINER PREPARATION AND SHIPMENT

doc: S101
Revision:

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1. SCOPE and APPLICATION

- 1.1. The procedures outlined below are to be followed for preparing sample shipment containers.
- 1.2. Included in this procedure are the requirements for producing Field Blanks and Trip Blanks.
- 1.3. The procedure is applicable for commercial clients and government contracts for containers being picked up or shipped via an overnight courier.

2. APPARATUS

- 2.1. Level II precleaned Sample bottles
- 2.2. Sample coolers
- 2.3. Ice bags
- 2.4. Preservation Reagents
- 2.5. Chain of Custody Documents, Custody Seals, Sample container labels, Hazardous contents labels

3. PROCEDURES

- 3.1. A request for bottle order form, Attachment 1 is initiated by marketing. It specifies the client, anticipated date of sampling, number of samples to be taken by matrix, the required methodology and any required QA/QC including Field and Trip Blanks or other project specific requirements.
- 3.2. The Sample Custody Officer or his assistant will prepare the bottle order either the day before or the day of anticipated sampling. Attachment 2, taken from the NJDEPE "Field Sampling Procedures Manual, May 1992" is referenced to determine the proper bottle type and preservative for the methodology requested. A chart that describes containers for Task Trip and Field blanks is given in Attachment 3. Footnotes from Attachment 2 also apply to Attachment 3.

NOTE: CLP Statement of Work references: The USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) references have been removed from the Attachment I referenced above. Envirotech Research will specify the SOW to be used as required by an overseeing Government Agency or that which has been proposed in a site specific QA Project Plan.

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- 3.3. The Sample Custody Officer or his assistant retrieves the appropriate glassware from the stock room. The bottles with the oldest date of receipt tag on them are always used first. The number of bottles required, taking into account the project QA/QC requirements are taken and staged on the bottle preparation bench and the appropriate preservative is added in accordance with Attachment 2.
- 3.4. A Hazardous contents label is affixed to each bottle spiked with a preservative that identifies the preservative and its CAS number. Additionally, the top of the bottle is marked with the preservative and the analytical parameter the bottle is to receive.
- 3.5. A bottle is filled with water and marked "Temperature Monitor Bottle". It accompanies the sample bottles and is used to record the temperature of the incoming samples in accordance with Envirotech Research SOP No. S103.
- 3.6. PREPARATION OF FIELD and TRIP BLANKS
 - 3.6.1. For projects which require a field blank, the Sample Custody Officer or his assistant determines the required parameters from the request for bottle order form and prepares the bottles as if the field blank were an aqueous environmental sample as outlined above.
 - 3.6.2. Additionally, another identical set of bottles are retrieved and not preserved. These bottles are filled with the analyte free laboratory water used for method blanks. They are not preserved. The bottles are labeled with the preprinted label that identifies the bottle's use as water for creation of the field blank. The analytical parameter is filled in on the label and the date the lab water added is written on the label.
 - 3.6.3. For projects which require a Trip Blank, the Sample Custody Officer or his assistant will preserve two 40 ml VOA vials with four drops of concentrated HCl and fill with analyte free water. A Hazardous contents label is affixed to each vial. Care must be taken to eliminate any air bubbles when filling and sealing the vials. An Envirotech Research sample label is filled out, noting the date and time prepared and the preparers signature.

- 3.6.4. The Field and Trip Blanks accompany the environmental sampling bottles to the site and back to the laboratory.
- 3.7. All the required bottleware, including the blanks and the Temperature Monitor Bottle are placed in a sufficient number of coolers. Do not stack bottles on top of each other.
- 3.8. For each cooler packed, two or more bags of ice are placed on top of the sample containers. After sampling, the ice is removed from the bags and poured over the samples.
- 3.9. Use one custody seal for each cooler. Record the number on the Chain of Custody document.
- 3.10. SAMPLE CONTAINER DELIVERY
 - 3.10.1. For containers being picked up by the samplers, sign the custody over to them upon their arrival to the laboratory after going over the contents with them in accordance with ETR SOP No. S100. Proceed to step 3.11.
 - 3.10.2. For containers being shipped by overnight courier, proceed with steps 3.11 and 3.12. Then fill out an air bill for each cooler and have it picked up by the overnight carrier. Retain the shipping receipt to document its delivery. This information will be included with the sampling documents when the samples are returned to the laboratory.
- 3.11. Place sample Chain of Custody documents, extra cooler custody seals and sample labels in a zip lock bag and tape it to the inside cover of the cooler.
- 3.12. Seal each cooler with a Custody Seal.

Analysis of TARGET COMPOUND LIST/TARGET ANALYTE LIST
Using USEPA-Contract Lab Program Methodologies for Aqueous and Nonaqueous Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Volatile Organics	Aqueous-G, black phenolic plastic screw cap, teflon-lined septum	Aqueous - 40 ml	Cool, 4 deg C, dark, 0.08% Na ₂ S ₂ O ₃ if residual Cl ₂	10 days	USEPA-CLP Statement of Work for Organic Analysis, Multi Media, Multi Concentration	(3)
	Nonaqueous-G, polypropylene cap, white teflon liner	Nonaqueous 120 ml		10 days		
Base Neutral/Acid Extractable (Semivolatile) Organics	Amber G, Teflon lined cap	1000 ml	Cool, 4 deg C, dark	Extraction Aqueous continuous liquid-liquid extraction must be <u>started</u> within 5 days Non-aqueous - <u>10 days</u> Analysis - 40 days from VTSR*	As Above	(3)
Pesticide/ PCB's	As Above	As Above	As Above	As Above	As Above	(3)

* Validated time of sample receipt (at the laboratory)

Analysis of TARGET COMPOUND LIST/TARGET ANALYTE LIST
Using USEPA-Contract Lab Program Methodologies for Aqueous and Nonaqueous Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
High Level Volatile Organic Waste Samples	Aqueous-G, black phenolic plastic screw cap, teflon-lined septum	Aqueous - 40 ml	Cool, 4 deg C, dark,	Analysis completed within 40 days of VTSR	USEPA-CLP Statement of Work for Organic Analysis-Multi Media, High Concentration	(3)
	Nonaqueous-G polypropylene cap, white teflon liner	Nonaqueous 120 ml		As Above		
High Concentration Extractable Organic Waste Samples	As Above	1000 ml	Cool, 4 deg C, dark	As Above	As Above	(3)
High Concentration Aroclors and Toxaphene samples	As Above	As Above	As Above	As Above	As Above	(3)

* Validated time of sample receipt (at the laboratory)

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Analysis of TARGET COMPOUND LIST/TARGET ANALYTE LIST
Using USEPA-Contract Lab Program Methodologies for Aqueous and Nonaqueous Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Polychlorinated Dibenzo-p-Dioxins (PCDDs) and Dibenzofurans (PCDFs)	As Above	<u>2000 ml</u> 1 pint	As Above	None	USEPA-CLP Statement of Work for Analysis of Polychlorinated Dibenzo-p-Dioxins (PCDD) Polychlorinated Dibenzofurans (PCDF) Multi-Medi, Multi-Concentration	(3)
Low Level Metals Water except Hg	Aqueous -P bottle, P cap, P liner	Aqueous - 1000 ml	Aqueous - HNO ₃ to PH<2	180 days	USEPA-CLP Statement of Work for Low Concentration Water for Inorganic Analysis 8/90	(3)
Hg	As Above	As Above	As Above	26 days	As Above	(3)

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* Validated time of sample receipt (at the laboratory)

Analysis of TARGET COMPOUND LIST/TARGET ANALYTE LIST
Using USEPA-Contract Lab Program Methodologies for Aqueous and Nonaqueous Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Cyanide, total amenable to chlorination	As Above	As Above	Aqueous - 0.6g ascorbic acid if residual Cl_2 , NaOH to pH>12, cool, 4 deg C until analyzed, CaCO_3 in presence of sulfide	12 days	As Above	(3)
Total Nitrogen	As Above	As Above	H_2SO_4 to pH<2	12 days	As Above	(3)
Fluoride	As Above	As Above	4 deg C until analysis	26 days	As Above	(3)
Metals except Hg	Aqueous - P bottle, P cap, P liner	Aqueous - 1000 ml	Aqueous - HNO_3 to pH<2	180 days	USEPA-CLP Statement of Work for Inorganic Analysis Multi Media, Multi Concentration	(3)
	Nonaqueous - Flint Glass bottle, black phenolic cap, polyethylene liner	Nonaqueous 4,8,16, or 32 oz	Nonaqueous - 4 deg C until analysis	As Above		
Hg	As Above	As Above	As Above	26 days	As Above	(3)

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* Validated time of sample receipt (at the laboratory)

Analysis of TARGET COMPOUND LIST/TARGET ANALYTE LIST
Using USEPA-Contract Lab Program Methodologies for Aqueous and Nonaqueous Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Cyanide	As Above	As Above	Aqueous - 0.6g ascorbic acid if residual Cl_2 , NaOH to pH>12, cool, 4 deg C until analyzed <u>CaCO_3 in presence of sulfide</u> Nonaqueous Cool, 4 deg C until analyzed	12 days	As Above	(3)
High Level Metals except Hg	Aqueous - P bottle, P cap, P liner	Aqueous - 1000 ml	Aqueous - HNO_3 to pH<2	180 days	USEPA-CLP Statement of Work for High Concentration Inorganic Analysis	(3)
	Nonaqueous - Flint Glass bottle, black phenolic cap, polyethylene liner	Nonaqueous 4,8,16, or 32 oz	Nonaqueous - 4 deg C until analysis	As Above		
Hg	As Above	As Above	As Above	26 days	As Above	(3)
Low Level Volatile Organics	Aqueous-G, black phenolic plastic screw cap teflon-lined septum	Aqueous - 40 ml	Cool, 4 deg C, dark, 0.008% $\text{Na}_2\text{S}_2\text{O}_3$	7 days	USEPA-CLP Statement of Work for Low Concentration Water for Volatile Organics	(3)

* Validated time of sample receipt (at the laboratory)

Analysis of TARGET COMPOUND LIST/TARGET ANALYTE LIST
Using USEPA-Contract Lab Program Methodologies for Aqueous and Nonaqueous Samples

<u>Parameter</u>	<u>Sample Container (1)</u>	<u>Container Volume</u>	<u>Preservation (2)</u>	<u>Maximum Holding Time*</u>	<u>Analytical Methodology</u>	<u>Sample Container Cleaning</u>
Cyanide	As Above	As Above	Aqueous - 0.6g ascorbic acid if residual Cl ₂ , NaOH to pH>12, cool, 4 deg C until analyzed, CaCO ₃ in presence of sulfide Nonaqueous Cool, 4 deg C until analyzed	12 days	As Above	(3)
Low Level Semi-volatile Organics	Amber G, Teflon Lined Cap	1000 ml	Cool, 4 deg C, dark	Extraction - Continuous extraction must be started within 5 days Analysis - 40 days from start of extraction	USEPA-CLP Statement of Work for Low Concentration Water for Organic Analysis	(3)
Low Level Pesticides/PCBs Organics	Amber G, Teflon Lined Cap	1000 ml	Cool, 4 deg C, dark	As Above	As Above	(3)

* Validated time of sample receipt (at the laboratory)

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Analysis of ORGANIC and INORGANIC Compounds Using USEPA SW-846 METHODOLOGIES
for Aqueous, Non-aqueous, and Waste Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Volatile Organics - Concentrated Waste Samples	G, wide mouth, teflon liner	8 oz	None	14 days	SW-846, 3rd edition, Vol 1-B; GC-8010, 8015, 8020; GC/MS-8240	(5)
Volatile Organics - Liquid Samples no residual Cl ₂	G vial, teflon lined septum cap	40 ml	4 drops conc. HCl, cool, 4 deg C	As Above	As Above	(5)
Volatile Organics - Liquid Samples residual Cl ₂	As Above	As Above	Collect sample in 4 oz Soil VOA container preserved w/10% Na ₂ S ₂ O ₃ . Gently mix sample and transfer to 40 ml VOA vial preserved w/4 drops conc. HCl, cool, 4 deg C	As Above	As Above	(5)
Volatile Organics - Liquid Samples for Acrolein and Acrylonitrile	As Above	As Above	Adjust to pH 4-5, cool, 4 deg C	As Above	SW-846, 3rd edition, Vol 1-B; GC-8030; GC/MS-8240	(5)

*Holding time begins at time of sample collection.

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Analysis of ORGANIC and INORGANIC Compounds Using USEPA SW-846 METHODOLOGIES
for Aqueous, Non-aqueous, and Waste Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Volatile Organics - Soil/Sediments Sludge	G, wide mouth, teflon liner	4 oz	Cool 4 deg C	As Above	SW-846, 3rd edition, Vol 1-B; GC-8010, 8015, 8020; GC/MS-8240, 8260	(5)
Sulfates	P, G	100 ml (12)	Cool, 4 deg C	28 days	SW-846, 3rd edition, Vol 1-C; 9035, 9036, 9038	(6)
Total Organic Carbon	G-Preferred P-If determined that there is no contributing organic contamination	100 ml (12)	Cool, 4 deg C, dark, HCl or H ₂ SO ₄ to pH<2 if analysis can't be done within 2 hrs	2 Hrs - unpreserved 28 days - preserved	SW-846, 3rd edition, Vol 1-C; 9060	(6)
Phenols	G only	1 liter (12)	Cool, 4 deg C, H ₂ SO ₄ to pH<2	28 days	SW-846, 3rd edition, Vol 1-C; 9065, 9066, 9067	(6)
Total recoverable oil and grease	G only, wide mouth	1 liter	Cool, 4 deg C <hr/> 5 ml HCl, Cool 4 deg C	Unpreserved- Few hrs <hr/> Preserved - 28 days	SW-846, 3rd edition, Vol 1-C; 9070	(7)

*Holding time begins at time of sample collection.

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Analysis of ORGANIC and INORGANIC Compounds Using USEPA SW-846 METHODOLOGIES
for Aqueous, Non-aqueous, and Waste Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Oil and grease for sludge	G	1 liter (12)	Cool, 4 deg C pH<2 HCl	28 days	SW-846, 3rd edition, Vol 1-C; 9071	(7) <u>No plastic tubing</u>
Total Petroleum Hydrocarbons	G	1 liter 4 oz	Cool, 4 deg C	Aqueous 7 days Non-Aqueous 28 days Gasoline in soil 7 days	Method 418.1 (modified for soil)	(7)
Total Coliform	P, G	1 liter (12)	Cool, 4 deg C, Na ₂ S ₂ O ₃ if residual Cl ₂ , EDTA if high in heavy metals	6 hrs	SW-846 3rd edition, Vol 1-C; 9131, 9132	(8)
Nitrate	P, G	1 liter (12)	Cool, 4 deg C, ----- H ₂ SO ₄ to pH<2, (2 ml/L)	24 hrs - Unpreserved ----- 28 days - preserved	SW-846, 3rd edition, Vol 1-C; 9200	(6)
Chloride	P, G	1 liter (12)	Cool, 4 deg C	28 days	SW-846, 3rd edition, Vol 1-C; 9250, 9251, 9252	(6)

*Holding time begins at time of sample collection.

**Analysis of ORGANIC and INORGANIC Compounds Using USEPA SW-846 METHODOLOGIES
for Aqueous, Non-aqueous, and Waste Samples**

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Radium 228	P	1 liter (12)	Cool, 4 deg C preserve at lab with HNO ₃ to pH<2, hold for minimum of 16 hrs before analysis, 6 mos. ----- HNO ₃ to pH<2, suggested at sampling	Transport to lab within 5 days, ----- 6 mos	SW-846, 3rd edition, Vol 1-C; 9320	(6)
Extractable Organics - Concentrated Waste Samples	G, wide mouth w/teflon liner	8 oz	Cool, 4 deg C	14 days	SW-846, 3rd edition, Vol 1-B; GC-8080; GC/MS-8270	(5)
Extractable Organics - Liquid Samples no residual Cl ₂	G, amber, w/teflon liner	1 gallon or 2 1/2 gallon	Cool, 4 deg C	Extraction 7 days ----- Analysis - 40 days from extraction	As Above	(5)

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*Holding time begins at time of sample collection.

Analysis of ORGANIC and INORGANIC Compounds Using USEPA SW-846 METHODOLOGIES
for Aqueous, Non-aqueous, and Waste Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Extractable Organics- Liquid Samples residual Cl ₂	G, amber, w/Teflon liner	1 gallon or 2 1/2 gallon	3 ml 10% Na ₂ S ₂ O ₃ per gallon, cool 4 deg C	Extraction 7 days ----- Analysis - 40 days from extraction	As Above	(5)
Extractable Organics - Soils/Sediments Sludges	G, wide mouth, w/Teflon liner	8 oz	Cool 4 deg C	14 days	As Above	(5)
Metals except Cr VI and Hg	P, G	600 ml	HNO ₃ to pH<2	6 mos	SW-846, 3rd edition, Vol 1-A; 7000 series	(9)
Hg (Total)	P, G	400 ml	HNO ₃ to pH<2	28 days	SW-846, 3rd edition, Vol 1-A; 7470, 7471	(9)
Cr VI	P, G	400 ml	Cool, 4 deg C	24 hrs	SW-846, 3rd edition, Vol 1-A; 7195, 7196, 7197, 7198	(9)

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*Holding time begins at time of sample collection.

**Analysis of ORGANIC and INORGANIC Compounds Using USEPA SW-846 METHODOLOGIES
for Aqueous, Non-aqueous, and Waste Samples**

<u>Parameter</u>	<u>Sample Container (1)</u>	<u>Container Volume</u>	<u>Preservation (2)</u>	<u>Maximum Holding Time*</u>	<u>Analytical Methodology</u>	<u>Sample Container Cleaning</u>
Cyanide, total and amenable to chlorination	P, G	1 liter or larger	Cool, 4 deg, 0.6g ascorbic acid NAOH to pH>12	14 days	SW-846, 3rd edition, Vol 1-C, 7195, 7196, 7197, 7198	(9)
Total Organic Halides (TOX)	G, vials, teflon septa. Amber G, teflon lined cap/foil lined cap	250 ml	Cool, 4 deg C, dark, H ₂ SO ₄ to pH<2, no headspace	7 days	SW-846, 3rd edition, Vol 1-C; 9020, 9022	(10)
Sulfides	P, G	1 liter (12)	Cool, 4 deg C, add 4 drops zinc acetate per 100 ml sample, NaOH to pH>9	7 days	SW-846, 3rd edition, Vol 1-C; 9030	(6)
Polychlorinated Dibenzo-p-Dioxin (PCDDs) and Polychlorinated Dibenzofurans (PCDFs)	G, with wide mouth w/teflon liner	1 pint	Cool, 4 deg C, dark	Extracted within 30 days and analyzed within 45 days of sampling	SW-846, 3rd edition, Vol 1-B; GC/MS-8280	(3)

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*Holding time begins at time of sample collection.

Analysis of Contaminants Using SAFE DRINKING WATER Methodologies (including 500 series) for Aqueous Samples

Contaminants	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
MICROBIOLOGY CONTAMINANTS						
Total coliforms	P,G	125 ml	0.008% Na ₂ S ₂ O ₃ if residual Cl ₂ , 0.3 ml/125 ml 15% EDTA if > 0.01 mg/l heavy metals, Cool, 4 deg C	30 hours	40 CFR 141	(8)
Fecal coliforms	As Above	As Above	As Above	As Above	As Above	As Above
<u>Escherichia coli</u>	As Above	As Above	As Above	As Above	As Above	As Above
Heterotrophic Plate Count	As Above	As Above	As Above	As Above	As Above	As Above
INORGANIC CONTAMINANTS AND NONTOXIC METALS						
Alkalinity	P,G	100 ml	Cool, 4 deg C	14 days	As Above	(20)
Asbestos (30)	As Above		As Above		As Above	
Calcium	As Above	100 ml	Conc. HNO ₃ to pH<2 (26)	6 months	As Above	(9)
Chloride	As Above	As Above	None	28 days	40CFR141,143	(20)
Color	As Above	As Above	Cool, 4 deg C	24 hours	40 CFR 143	As Above
Conductivity	As Above	100 ml	As Above	As Above	40 CFR 141	As Above
Cyanide	As Above	500 ml	Cool, 4 deg C	14 days	40CFR141,143	As Above
Fluoride	As Above	300 ml	None	1 month	As Above	As Above
Foaming agents	As Above	250 ml	Cool, 4 deg C	48 hours	40 CFR 143	As Above

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* Holding time begins at time of sample collection

Analysis of Contaminants Using SAFE DRINKING WATER Methodologies (including 500 series) for Aqueous Samples

Contaminants	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Nitrate	P,G	250 ml	Cool, 4 deg C	28 days	40 CFR 141	(20)
chlorinated	As Above	As Above	Conc. H ₂ SO ₄ to pH<2	14 days	As Above	As Above
non-chlorinated						
Nitrite	As Above	50 ml	Cool, 4 deg C	48 hours	As Above	As Above
Odor	G only	200 ml	As Above	24 hours	40 CFR 143	As Above
Orthophosphate (unfiltered)	P,G	50 ml	Cool, 4 deg C	24 hours	40 CFR 141	As Above
Residue, Non-filterable (TDS)	As Above	100 ml	Cool, 4 deg C	7 days	40 CFR 143	As Above
Residue-total filterable (TSS)	As Above	As Above	As Above	As Above	As Above	As Above
Silica	P only	50 ml	As Above	As Above	As Above	As Above
Sulfate	P,G	50 ml	As Above	28 days	As Above	As Above
Turbidity	As Above	100 ml	As Above	48 hours	As Above	As Above
ANALYZE IMMEDIATELY INORGANIC CONTAMINANTS						
Chlorine, residual	As Above	200 ml	None	15 minutes	As Above	As Above
Chlorine Dioxide	As Above		As Above	As Above	As Above	As Above
Ozone, residual	G, only		As Above	As Above	As Above	As Above
pH	P,G	25 ml	As Above	As Above	40CFR141,143	As Above
Temperature	As Above	1000 ml	As Above	As Above	40 CFR 141	As Above

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* Holding time begins at time of sample collection

Analysis of Contaminants Using SAFE DRINKING WATER Methodologies (including 500 series) for Aqueous Samples

Contaminants	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
INORGANIC CONTAMINANTS, TOXIC METALS(26)						
Aluminum, Total	P,G	100 ml	Conc HNO ₃ to pH<2	6 months	40 CFR 143	(9)
Antimony, Total	As Above	As Above	As Above	As Above	40 CFR 141	As Above
Arsenic, Total	As Above	As Above	As Above	As Above	As Above	As Above
Barium, Total	As Above	As Above	As Above	As Above	As Above	As Above
Beryllium, Total	As Above	As Above	As Above	As Above	As Above	As Above
Cadmium, Total	As Above	As Above	As Above	As Above	As Above	As Above
Chromium, Total	As Above	As Above	As Above	As Above	As Above	As Above
Copper, Total	As Above	As Above	As Above	As Above	40CFR141,143	As Above
Iron, Total	As Above	As Above	As Above	As Above	40 CFR 143	As Above
Lead, Total	As Above	As Above	As Above	As Above	40 CFR 141	As Above
Manganese, Total	As Above	As Above	As Above	As Above	40 CFR 143	As Above
Mercury, Total	As Above	As Above	As Above	28 days	40 CFR 141	As Above
Nickel, Total	As Above	As Above	As Above	6 months	As Above	As Above
Selenium, Total	As Above	As Above	As Above	As Above	As Above	As Above
Silver, Total	As Above	As Above	As Above	As Above	40CFR141,143 (31)	As Above
Sodium, Total	As Above	As Above	As Above	As Above	40 CFR 141	As Above
Thallium, Total	As Above	As Above	As Above	As Above	As Above	As Above
Zinc, Total	As Above	As Above	As Above	As Above	40 CFR 143	(9)

* Holding time begins at time of sample collection

300376

Analysis of Contaminants Using SAFE DRINKING WATER Methodologies (including 500 series) for Aqueous Samples

Contaminants	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
ORGANIC CONTAMINANTS, EXCLUDING GC/MS						
Chlorinated Hydrocarbons	G, foil or Teflon lined cap		Cool at 4 deg C ASAP after collection	<u>extraction:</u> 14 days <u>analysis:</u> 40 days	40 CFR 141 SM16-509A	(24)
Chlorophenoxys	As Above		As Above	<u>extraction:</u> 7 days <u>analysis:</u> 30 days	40 CFR 141: SM16-509B	(25)
Trihalomethanes-total (TTM)	G, narrow screw cap with PTFE-fluorocarbon faced silicone septa cap liner	25 ml (501.1) 40 ml (501.2)	2.5-3 mg/40 ml Na ₂ S ₂ O ₃ or sodium sulfite	14 days	40 CFR 141 Method 501.1 Method 501.2	(4)
Trihalomethanes maximum potential	As Above	40 ml	25 deg C No reducing agent	Hold 7 days before analysis	As Above	As Above
Volatile Halogenated Organic Compounds	Screw cap vials, PTFE-faced silicone septum	40 ml - 120 ml	1:1 HCl to pH<2 Cool, 4 deg C until analysis	14 days	40 CFR 141 Method 502.1	As Above
Volatile Organic Compounds	As Above	As Above	As Above	As Above	40 CFR 141 Method 502.2	As Above

300377

* Holding time begins at time of sample collection

Analysis of Contaminants Using SAFE DRINKING WATER Methodologies (including 500 series) for Aqueous Samples

Contaminants	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Volatile Aromatic and Unsaturated Organic Compounds	Screw cap vials, PTFE faced silicone septum	40-120 ml	1:1 HCl to pH<2 Cool, 4 deg C until analysis	14 days	40 CFR 141 Method 503.1	(4)
EDB/DBCP	As Above	40 ml	Cool 4 deg C 0.08% Na ₂ S ₂ O ₃ if residual Cl ₂ 1:1 HCl to pH<2	28 days	40 CFR 141 Method 504	As Above
Organohalide Pesticides and Commercial PCB Products (Arochlors)	As Above	As Above	3 mg Na ₂ S ₂ O ₃ or 7 uL Na ₂ S ₂ O ₃ (0.04 g/ml), Cool, 4 deg C until analyzed	If Heptachlor <u>Extraction:</u> 7 days <u>Analysis:</u> 40 days If no extraction analysis 14 days(28)	40 CFR 141 Method 505	(14)
Di-2(ethylhexyl) adipate Di-2(ethylhexyl) phthalate					40 CFR 141 Method 506	
Nitrogen- and Phosphorus-Containing Pesticides	Borosilicate w/graduations, screw caps lined with PTFE-fluorocarbon extracted with methanol overnight	1-liter	HgCl to produce concentrations of 10 mg/L, 80 mg Na ₂ S ₂ O ₃ if residual Cl ₂ Cool 4 deg C away from light until extraction	<u>Extraction:</u> disulfoton sulfoxide, diazinon pronamide, terbufos 7 days; 14 day extract holding time(28)	40 CFR 141 GC-Method 507	(23)

300378

* Holding time begins at time of sample collection

Analysis of Contaminants Using SAFE DRINKING WATER Methodologies (including 500 series) for Aqueous Samples

Contaminants	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Chlorinated Pesticides	Borosilicate w/graduations, screw caps lined with PTFE-fluorocarbon extracted with methanol overnight	1-liter	HgCl to produce concentration of 10 mg/L. Seal bottle and shake vigorously for 1 minute. Cool, 4 deg C until extraction	Extraction: 7 days Analysis: 14 days after extraction(28)	40 CFR 141 Method 508	(23)
PCBs (Screening)	As Above	As Above	Cool, 4 deg C	Extraction: 7 days Analysis: 30 days (28)	40 CFR 141 Method 508A	(23)
Chlorinated phenoxy Acids	As Above	As Above	80 mg Na ₂ S ₂ O ₃ if residual Cl ₂	Extraction: 14 days Analysis: 28 days	40 CFR 141 Method 515.1	(23)
N-Methyl Carbamoyloximes Carbamates	G, screw cap vials with PFTE-faced silicone	60 ml	1.8 ml monochloroacetic acid buffer. 80 mg Na ₂ S ₂ O ₃ if residual Cl ₂ Cool, 4 deg C	28 days	40 CFR 141 Method 531.1	(17)
Glyphosphate					40 CFR 141 Method 547	
Endothall					40 CFR 141 Method 548	
Diquat					40 CFR 141 Method 549	
Benzo(a)pyrene					40 CFR 141 Method 550 Method 550.1	

300379

* Holding time begins at time of sample collection

Analysis of Contaminants Using SAFE DRINKING WATER Methodologies (including 500 series) for Aqueous Samples

Contaminants	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
ORGANIC CONTAMINANTS, GC/MS						
Trihalomethanes	G, screw cap Teflon faced silicone septum	25 ml	10 mg Na ₂ S ₂ O ₃ or sodium sulfite	14 days	40 CFR 141 GC/MS 501.3 GC/MS (SIM) 501.3	(4)
2,3,7,8-TCDD (Dioxin)					40 CFR 141 Method 513	
Purgeable Organic Compounds	As Above	60-120 ml	1:1 HCl to pH <2 1 drop/20 ml Chill, 4 deg C	14 days	40 CFR 141 GC/MS-524.1 GC/MS-524.2	(4)
Organic Compounds	G, amber Teflon-lined screw caps	1-L or 1 quart	if residual Cl ₂ 40-50 mg sodium arsenite or sodium thiosulfate if unchlorinated 6 N HCl to pH < 2	<u>Extraction:</u> 7 days <u>Analysis:</u> 30 days	40 CFR 141 GC/MS-525.1 rev. 3.0	(16)
RADIOCHEMISTRY CONTAMINANTS, RADIOACTIVITY AND RADIONUCLIDES						
Gross Alpha & Beta	P,G		Conc. HNO ₃ or HCl to pH 2		40 CFR 141	
Strontium 89,90	As Above		As Above		As Above	
Radium-total	As Above		As Above		As Above	
Radium-226	As Above		As Above		As Above	
Radium-228	As Above		As Above		As Above	
Ruthenium-106	As Above		As Above		As Above	
Cesium-134	As Above		Conc HCl to pH 2		As Above	
Cesium-137	As Above		As Above		As Above	

* Holding time begins at time of sample collection

Analysis of Contaminants Using SAFE DRINKING WATER Methodologies (including 500 series) for Aqueous Samples

Contaminants	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Cobalt-60	P,G		Conc. HNO ₃ or HCl to pH 2		40 CFR 141	
Iodine-131	As Above		None		As Above	
Tritium	G		As Above		As Above	
Uranium	P,G		Conc. HNO ₃ or HCl to pH 2		As Above	
Photon emmitters	As Above		As Above		As Above	
RADON IN DRINKING WATER						
Radon	G with Teflon-lined septum		Cool, 4 deg C		23 NJR 1423 N.J.A.C. 7:18	

300381

* Holding time begins at time of sample collection

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
BIOLOGICAL PARAMETERS						
Coliform (fecal)	P,G	125 ml	Cool, 4 deg C, 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	6 hours	40 CFR 136.3	(8)
Coliform (fecal) chlorine present	As Above	As Above	As Above	As Above	As Above	As Above
Coliform (total)	As Above	As Above	As Above	As Above	As Above	As Above
Coliform (total) chlorine present	As Above	As Above	As Above	As Above	As Above	As Above
Fecal streptococci	As Above	As Above	As Above	As Above	As Above	As Above
Enterococci	As Above	As Above	As Above	As Above	SM17 9230 B;C	As Above
Heterotrophic Plate Count	As Above	As Above	As Above	As Above	SM17 9215B;C;D	As Above
<u>Pseudomonas</u> <u>aeruginosa</u>	As Above	As Above	As Above	As Above	SM17 9213 E;F	As Above
INORGANIC PARAMETERS, NUTRIENTS AND DEMANDS						
Acidity	As Above	100 ml	Cool, 4 deg C	14 days	40 CFR 136.3	(20)
Alkalinity	As Above	As Above	As Above	As Above	As Above	As Above
Ammonia (as N)	As Above	400 ml	Cool, 4 deg C, H ₂ SO ₄ to pH<2	28 days	As Above	As Above
Biochemical oxygen demand (BOD ₅)	As Above	1000 ml	Cool, 4 deg C	48 hours	As Above	As Above

*Holding time begins at time of sample collection

300382

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Boron-total	P,G	100 ml	HNO ₃ to pH<2	6 months	40 CFR 136.3	(9)
Bromide	P,G	100 ml	None Required	28 days	40 CFR 136.3	(20)
Calcium-total	As Above	100 ml	HNO ₃ to pH<2	6 months	As Above	(9)
Carbonaceous biochemical oxygen demand (CBOD ₅)	As Above	1000 ml	Cool, 4 deg C	48 hours	As Above	(20)
∞ Chemical oxygen demand (COD)	As Above	50 ml	Cool, 4 deg C, H ₂ SO ₄ to pH<2	28 days	As Above	As Above
Chloride	As Above	As Above	None Required	As Above	As Above	As Above
Color	As Above	50 ml	Cool, 4 deg C	48 hours	As Above	As Above
Cyanide-total	As Above	500 ml	Cool, 4 deg C, NaOH to pH>12 0.6g ascorbic acid if residual Cl ₂	<u>sulfide absent</u> 14 days <u>sulfide present</u> 24 hours(22)	As Above	As Above
Cyanide amenable to chlorination	As Above	As Above	As Above	As Above	As Above	As Above
Flouride-total	P	300 ml	None Required	28 days	As Above	As Above
Hardness-total	P,G	100 ml	HNO ₃ to pH<2, H ₂ SO ₄ to pH<2	6 months	As Above	As Above
Kjeldahl nitrogen -total (as N)	As Above	500 ml	Cool, 4 deg C, H ₂ SO ₄ to pH<2	28 days	As Above	As Above
Magnesium-total	As Above	100 ml	HNO ₃ to pH<2	6 months	As Above	(9)

*Holding time begins at time of sample collection

300383

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Nitrate (as N)	P,G	100 ml	Cool, 4 deg C	48 hours	40 CFR 136.3	(20)
Nitrate-nitrite (as N)	P,G	100 ml	Cool, 4 deg C H ₂ SO ₄ to pH<2	28 days	40 CFR 136.3	(20)
Nitrite (as N)	As Above	50 ml	Cool, 4 deg C	48 hours	As Above	As Above
Oil and grease -total recoverable	G	1000 ml	Cool, 4 deg C, HCl or H ₂ SO ₄ to pH<2	petroleum based 3 days non-petroleum 24 hours	As Above	As Above
Organic carbon -total (TOC)	P,G	25 ml	As Above	As Above	As Above	As Above
Organic nitrogen (as N) (29)						
Orthophosphate (as P)	As Above	50 ml	Filter immediately, Cool, 4 deg C	48 hours	As Above	As Above
Oxygen-dissolved (Winkler)	G, bottle and top	300 ml	Fix on site and and store in dark	8 hours	As Above	As Above
Phenols	G only	500 ml	Cool, 4 deg C, H ₂ SO ₄ to pH<2	28 days	As Above	As Above
Phosphorus (elemental)	As Above	50 ml	Cool, 4 deg C	48 hours	As Above	As Above
Phosphorus-total	P,G	50 ml	Cool, 4 deg C, H ₂ SO ₄ to pH<2	28 days	As Above	As Above
Potassium-total	P,G	100 ml	HNO ₃ to pH<2	6 months	As Above	(9)
Residue-total	As Above	As Above	Cool, 4 deg C	7 days	As Above	(20)

*Holding time begins at time of sample collection

300384

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Residue-filterable (TDS)	P,G	100 ml	Cool, 4 deg C	7 days	40 CFR 136.3	(20)
Residue, non-filterable (TSS)	As Above	As Above	As Above	As Above	As Above	As Above
Residue-settleable	As Above	1000 ml	As Above	48 hours	As Above	As Above
Residue-volatile	As Above	100 ml	As Above	7 days	As Above	As Above
Salinity	G	100 ml	As Above	28 days	SM17-2520 B;C	As Above
Silica-dissolved	P	50 ml	Cool, 4 deg C	28 days	40 CFR 136.3	As Above
Sodium-total	P,G	100 ml	HNO ₃ to pH<2	6 months	As Above	As Above
Specific conductance	As Above	100 ml	Cool, 4 deg C	28 days	As Above	(20)
Sulfate (as SO ₄)	As Above	50 ml	As Above	As Above	As Above	As Above
Sulfide (as S)	As Above	500 ml	Cool, 4 deg C, add zinc acetate plus NaOH to pH>9	7 days	As Above	As Above
Surfacants	As Above	250 ml	Cool, 4 deg C	48 hours	As Above	As Above
Tannin and lignin	P,G	50 ml	Cool, 4 deg C	28 days	SM17-5550 B	As Above
Turbidity	P,G	100 ml	Cool, 4 deg C	48 hours	40 CFR 136.3	(20)

*Holding time begins at time of sample collection

300385

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
ANALYZE IMMEDIATELY (<15 MINUTES), INORGANIC PARAMETERS						
Chlorine-total residual	P,G	200 ml	None	Analyze immediately	40 CFR 136.3	(20)
Hydrogen ion (pH)	As Above	25 ml	None	As Above	As Above	As Above
Oxygen-dissolved (probe)	G, Bottle and Top	300 ml	None	As Above	As Above	As Above
Sulfite (as SO ₃)	As Above	50 ml	None	As Above	As Above	As Above
Temperature	As Above	1000 ml	None	As Above	As Above	As Above
INORGANIC PARAMETERS, TOXIC METALS						
Aluminum-total	P,G	100 ml	HNO ₃ to pH<2	6 months	As Above	(9)
Antimony-total	As Above	As Above	As Above	As Above	As Above	As Above
Arsenic-total	As Above	As Above	As Above	As Above	As Above	As Above
Barium-total	As Above	As Above	As Above	As Above	As Above	As Above
Beryllium-total	As Above	As Above	As Above	As Above	As Above	As Above
Cadmium-total	As Above	As Above	As Above	As Above	As Above	As Above
Chromium VI -dissolved	As Above	200 ml	Cool, 4 deg C	24 hours	As Above	As Above
Chromium-total	As Above	100 ml	HNO ₃ to pH<2	6 months	As Above	As Above
Cobalt-total	As Above	As Above	As Above	As Above	As Above	As Above
Copper-total	As Above	As Above	As Above	As Above	As Above	As Above

*Holding time begins at time of sample collection

300386

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Gold-total	P,G	100 ml	HNO ₃ to pH<2	6 months	40 CFR 136.3	(9)
Iridium-total	P,G	100 ml	HNO ₃ to pH<2	6 months	40 CFR 136.3	(9)
Iron-total	As Above	As Above	As Above	As Above	As Above	As Above
Lead-total	As Above	As Above	As Above	As Above	As Above	As Above
Manganese-total	As Above	As Above	As Above	As Above	As Above	As Above
Mercury-total	As Above	As Above	HNO ₃ to pH<2	28 days	As Above	As Above
Molybdenum-total	As Above	As Above	As Above	6 months	As Above	As Above
Nickel-total	As Above	As Above	As Above	As Above	As Above	As Above
Osmium-total	As Above	As Above	As Above	As Above	As Above	As Above
Palladium-total	As Above	As Above	As Above	As Above	As Above	As Above
Platinum-total	As Above	As Above	As Above	As Above	As Above	As Above
Rhodium-total	As Above	As Above	As Above	As Above	As Above	As Above
Ruthenium-total	As Above	As Above	As Above	As Above	As Above	As Above
Selenium-total	As Above	As Above	As Above	As Above	As Above	As Above
Silver-total	As Above	As Above	As Above	As Above	As Above	As Above
Thallium-total	As Above	As Above	As Above	As Above	As Above	As Above
Tin-total	As Above	As Above	As Above	As Above	As Above	As Above
Titanium-total	As Above	As Above	As Above	As Above	As Above	As Above
Vanadium-total	As Above	As Above	As Above	As Above	As Above	As Above

*Holding time begins at time of sample collection

300387

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Zinc-total	P,G	100 ml	HNO ₃ to pH<2	6 months	40 CFR 136.3	(9)
ORGANIC PARAMETERS, EXCLUDING GC/MS						
Purgeable halocarbons	G, vial screw cap with center hole Teflon-faced silicone septum	25 ml or larger	Cool, 4 deg C, 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	14 days GC-601	40 CFR 136.3	(4)
Purgeable aromatic hydrocarbons	As Above	As Above	Cool, 4 deg C, 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂ 1:1 HCl to pH 2	Without HCl 7 days with HCl 14 days	40 CFR 136.3 GC-602	As Above
Acrolein Acrylonitrile	As Above	As Above	Cool, 4 deg C, 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂ pH 4-5 with 1:1 HCl if samples analyzed for acrolein	Samples for acrolein with no pH adjustment 3 days; with pH adjustment or not for acrolein 14 days	40 CFR 136.3 GC-603	As Above
Phenols	amber glass or protect from light, screw cap lined with Teflon (or foil if sample not corrosive)	1 liter 1 quart	Cool, 4 deg C, 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	7 days until extraction 40 days after extraction	40 CFR 136.3 GC-604	As Above

*Holding time begins at time of sample collection

300388

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Benzidines	amber glass or protect from light screw cap lined with Teflon (or foil if sample not corrosive)	1 liter	Cool, 4 deg C, 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂ store in dark H ₂ SO ₄ to pH 2-7 if 1,2-diphenyl hydrazine is likely to be present: pH to 4.0 +/- 0.2	Extraction 7 days Analysis 7 days after extraction if stored under inert (oxidant free) atmosphere	40 CFR 136.3 HPLC-605	(4)
34 Phthalate esters	As Above	As Above	Cool, 4 deg C	7 days until extraction 40 days after extraction	40 CFR 136.3 GC-606	As Above
Nitrosamines	As Above	As Above	Cool, 4 deg C, store in dark 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂ for determination of N-nitrosodiphenylamine NaOH or H ₂ SO ₄ to pH 7-10	As Above	40 CFR 136.3 GC-607	As Above
Organochlorine Pesticides & PCBs	As Above	1 liter 1 quart	Cool, 4 deg C NaOH/H ₂ SO ₄ to pH 5-9 if aldrin to be determined. 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	Extraction 72 hours w/o pH adjustment 7 days with pH adjustment 40 days after extraction	40 CFR 136.3 GC-608	As Above
Nitroaromatics and isophorone	As Above	As Above	Cool, 4 deg C, dark 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	7 days until extraction 40 days after extraction	40 CFR 136.3 GC-609	As Above

*Holding time begins at time of sample collection

300389

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Polynuclear aromatic hydrocarbon	Amber glass or protect from light screw cap lined with Teflon (or foil if sample not corrosive)	1 liter	Cool, 4 deg C, dark 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	7 days until extraction 40 days after extraction	40 CFR 136.3 HPLC-610	(4)
Haloethers	As Above	As Above	As Above	As Above	40 CFR 136.3 GC-611	As Above
Chlorinated Hydrocarbons	As Above	As Above	Cool, 4 deg C	As Above	40 CFR 136.3 GC 612	As Above
ORGANIC PARAMETERS, MASS SPECTROMETRY						
2,3,7,8-Tetrachloro-dibenzo-p-dioxin (TCDD)	G, screw cap lined with Teflon (or foil if sample not corrosive) amber glass or protect from light	1 liter	Cool, 4 deg C, 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	As Above	40 CFR 136.3 GC/MS-613	(13)
Purgeables [except benzene toluene ethyl benzene(32)]	G, Teflon faced silicone septum, screw cap with hole in center	25 ml or larger	As Above	14 days	40 CFR 136.3 GC/MS-624	(4)
Purgeables [benzene toluene ethylbenzene(32)]	As Above	As Above	Cool, 4 deg C, 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂ 1:1 HCl to pH<2	Without HCl 7 days With HCl 14 days	As Above	As Above

*Holding time begins at time of sample collection

300390

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Base/Neutrals and Acids	G, screw cap lined with Teflon (or foil if sample not corrosive amber bottle or protect from light	1 liter 1 quart	Cool, 4 deg C, 0.008% $\text{Na}_2\text{S}_2\text{O}_3$ if residual Cl_2	7 days until extraction 40 days after extraction	40 CFR 136 GC/MS-625	(13)
36 Volatile Organic Compounds by Isotope Dilution GC/MS (except benzene, toluene ethyl benzene(32))	G, Teflon-faced silicone septum, screw cap with center hole	25 ml to 40 ml	Cool, 0-4 deg C, 0.008% $\text{Na}_2\text{S}_2\text{O}_3$ if residual Cl_2 ,	14 days	40 CFR 136 GC/MS-1624	(4)
Volatile Organic Compounds by Isotope Dilution GC/MS (benzene, toluene, ethyl benzene only(32))	As Above	As Above	Cool, 0-4 deg C, 0.008% $\text{Na}_2\text{S}_2\text{O}_3$ if residual Cl_2 1:1 HCl to pH<2	Without HCl 7 days With HCl 14 days	As above	(4)
Semivolatile Organic Compounds by Isotope Dilution GC/MS	Amber glass or protect from light Teflon lined cap (or aluminum foil if sample non-corrosive)	1.1 liter or greater	Cool, 0-4 deg C, 0.008% $\text{Na}_2\text{S}_2\text{O}_3$ if residual Cl_2	As Above	40 CFR 136 GC/MS-1625	(14)

*Holding time begins at time of sample collection

300391

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding time*	Analytical Methodology	Sample Container Cleaning
PESTICIDES TESTS						
Organochlorine Pesticides & PCBs	Amber glass or protect Teflon lined cap (or aluminum foil if sample not corrosive)	1 liter 1 quart	Cool, 4 deg C NaOH/H ₂ SO ₄ to pH 5-9 if aldrin to be determined add 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	Extraction 72 hours w/o pH adjustment 7 days with pH adjustment 40 days after extraction	40 CFR 136.3 GC-608	(14)
AQUATIC TOXICITY						
Dilution Water	wide mouth lead free glass or unplasticized plastic container	30 liters	none	96 hours	N.J.A.C. 7:18-Subchapter 6	(27)
Effluent	As Above	15 liters	<2hr: test temp. >2hr: Cool, 4 deg C	24 hours	As Above	(27)
RADIOCHEMISTRY PARAMETERS, RADIOACTIVITY AND RADIONUCLIDES						
Alpha-total	P,G		HNO ₃ to pH<2	6 months	40 CFR 136.3	(9)
Alpha-counting error	As Above		As Above	As Above	As Above	As Above
Beta-total	As Above		As Above	As Above	As Above	As Above
Beta-counting error	As Above		As Above	As Above	As Above	As Above
Radium-total	As Above		As Above	As Above	As Above	As Above
Radium-226	As Above		As Above	As Above	As Above	As Above

*Holding time begins at time of sample collection

Analysis of Parameters Using CLEAN WATER ACT NPDES (NJPDES) Methodologies for WASTEWATER Samples

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
RADON IN WASTEWATER						
Radon	P,G		HNO ₃ to pH<2	6 months	N.J.A.C. 7:18 23 NJR 1423	(9)

*Holding time begins at time of sample collection

300393

ANALYSIS OF PARAMETERS USING SLUDGE METHODOLOGIES FOR SLUDGE SAMPLES

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
METALS						
Chromium VI	P,G	400 ml	Cool, 4 deg C	48 hours	SW-846	(9)
Mercury	As Above	500 ml	HNO ₃ to pH<2	28 days	SW-846	As Above
Metals	As Above	1000 ml	As Above	6 months	DEP 100	As Above
ORGANIC COMPOUNDS						
Extractables (including phthalates, nitrosamines, organochlorine pesticides, PCBs, nitroaromatics, isophorone, polynuclear aromatic hydrocarbons, haloethers, chlorinated hydrocarbons and TCDD)	G, Teflon-lined cap	1000 ml	Cool, 4 deg C 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	<u>Extraction:</u> 7 days <u>Analysis:</u> 30 days	625s	(13)
Extractables (phenols)	As Above	As Above	Cool, 4 deg C H ₂ SO ₄ to pH<2 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	As Above	As Above	As Above
Purgeables (Halocarbons and Aromatics)	G, Teflon-lined septum	50 ml	Cool, 4 deg C 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂ HCl to pH<2	14 days	624s	(18)

* Holding time begins at time of sample collection

ANALYSIS OF PARAMETERS USING SLUDGE METHODOLOGIES FOR SLUDGE SAMPLES

Parameter	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Purgeables (Acrolein and Acrylonitrile)	G, Teflon lined septum	40 ml	Cool, 4 deg C 0.008% Na ₂ S ₂ O ₃ if residual Cl ₂	14 days	624s	(18)
Pesticides	G, Teflon- lined cap	1000 ml	As Above	<u>Extraction:</u> 7 days <u>Analysis:</u> 30 days	625s	(13)
pH			Cool, 4 deg C		DEP 010	(19)
Residue total	P,G wide mouth air tight		As Above		DEP 012	(20)
Residue, volatile, ash	As Above		As Above		DEP 013	As Above
Phenols	P,G wide mouth		As Above		DEP 032	As Above
Oil and Grease	As Above		As Above		DEP 036	As Above

* Holding time begins at time of sample collection

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Analysis of BIOLOGICAL Samples Using NJDEPE Methodologies
for Freshwater, Estuarine And Marine Samples

Contaminant	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
PHYTOPLANKTON						
FRESHWATER						
Species Composition						
(live samples)	P,G	250 ml	Cool, 4 deg C	24 hours	SM17:10200 EPA73: Plankton 3,4	(20)
(preserved)	As Above	1000 ml	50 ml neutralized formalin Store/transport in dark, cool container	1 month	As Above	As Above
Chlorophyll <u>a</u>	P,G amber or foil-covered	250 ml	Cool, 4 deg C store/transport in dark	48 hours	SM17:10200H EPA73: Plankton 5.2	As Above
MARINE AND ESTUARINE						
Species Composition						
(live samples)	P,G	250 ml	Cool, 4 deg C	24 hours	SM17:10200 EPA73: Plankton 3,4	As Above
(preserved)	As Above	1000 ml	10 ml or more Lugol's solution to maintain weak tea color. Store/transport in dark, cool container.	48 hours	As Above	As Above

* Holding time begins at time of sample collection

Analysis of BIOLOGICAL Samples Using NJDEPE Methodologies
for Freshwater, Estuarine And Marine Samples

Contaminant	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
PHYTOPLANKTON						
MARINE AND ESTUARINE						
Chlorophyll <u>a</u>	P,G amber or foil-covered	250 ml	Cool, 4 deg C Store/transport in dark.	48 hours	SM17:10200H EPA73: Plankton 5.2	(20)
ZOOPLANKTON						
Freshwater	P,G	6,000 ml	300 ml neutralized formalin. Store in cool container	1 month	SM17: 10200 EPA73: Plankton 3,4	As Above
Marine & Estuary	As Above	As Above	5% formalin (5 ml) neutralized formalin/100 ml tap water), store and transport in cool container	As Above	As Above	As Above
PERIPHYTON						
DIATOMETER SLIDES AND ROCK SCRAPINGS						
Species composition	120 ml jar polyseal cap	N/A	5% formalin (5 ml neutralized formalin/100 ml tap water), store and transport in cool container	1 month	SM17: 10300 EPA73: Periphyton 3	As Above

* Holding time begins at time of sample collection

300397

Analysis of BIOLOGICAL Samples Using NJDEPE Methodologies
for Freshwater, Esturine And Marine Samples

Contaminant	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
PERIPHYTON						
Chlorophyll <u>a</u>	As Above	30 ml	90% neutralized acetone, cool 0-4 deg C, store and transport in dark container.	48 hours	SM17: 10300 EPA73: Periphyton 3.2	(20)
Ash Free Weight	120 ml jar polyseal cap	30 ml	90 % neutralized acetone, cool 0-4 deg C, store and transport in dark container	N/A	SM17:10300 EPA73: Plankton 5.1	As Above
MACROINVERTEBRATES						
Species composition	P,G	N/A	5% neutralized formalin (5 ml neutralized formalin/100 ml sample water)	N/A	SM17:10500 EPA73: Macroinvertebrates 4.0	As Above

* Holding time begins at time of sample collection

FOOTNOTES

1. P = Plastic, hard or soft G = Glass, hard or soft

Discard bottles which have chips, cracks and etched surfaces. Bottle closures must be water tight. Microbiological sample containers must resist sterilization and solvent action of water. Sterilization must not produce toxic materials or bacteriostatic or nutritive compounds. Presterilized plastic bags can be used for drinking water total coliform samples.

2. $\text{Na}_2\text{S}_2\text{O}_3$ = Sodium thiosulfate

HCl = Hydrochloric acid

Cl_2 = Chlorine

EDTA = Ethylenediaminetetraacetic acid tetrasodium salt

NaOH = Sodium hydroxide

neutralized formalin = 100% neutralized formalin with sodium tetraborate to pH 7.0 - 7.3

3. USEPA Statement of Work for Sample Container Repository, 4/85, Attachment A

4. Detergent wash. Tap water rinse. Distilled water rinse. Air dry. Heat in oven at 105 degrees Celsius for one hour. Cool in area free of organics.

5. SW-846, 3rd edition, Volume 1-B, Section 4.1.4

6. Sample container cleaning procedure not specified

7. Washed. Rinse with extraction solvent (Chlorofluorocarbon 113).

8. Detergent, hot water wash. Hot tap water rinse. Rinse three times with distilled and deionized (ASTM Type II) water (non-toxic tubing material). Cover tops and necks of glass closure bottles with aluminum foil or heavy craft paper. Sterilize in autoclave at 121 degrees Celsius for 15 minutes or in hot air oven at 170 degrees Celsius for two hours.

9. Detergent and tap water wash. 1:1 HNO_3 rinse. Tap water rinse. Distilled and deionized (ASTM Type II) water rinse. (Additional option: Chromic acid or NOCHROMIX rinse, thorough Distilled and deionized (ASTM Type II) water rinse to remove all traces of chromium. Do not use on plastic bottles.)

10. Chromium cleaning solution. Detergent wash, hot. Tap water rinse. Distilled water rinse. Drain dry. Muffle furnace, 400 degrees Celsius C 15-30 minutes. Seal and store free from dust.

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11. Detergent wash, hot. Hot tap water rinse. Drain dry. Muffle furnace at 400 degrees Celsius for 15-30 minutes. Acetone rinse followed by hexane rinse may be substituted for muffle furnace. Store inverted or capped with foil.
12. Sample container volume is not specified in methodology. Volume is recommended by NJDEPE-Bureau of Environmental Measurements and Quality Assurance.
13. Washed, rinsed with acetone or methylene chloride and dried before use.
14. Detergent wash, hot. Tap water rinse. Distilled and deionized (ASTM Type II) water rinse. Drain dry. Oven or muffle furnace at 400 degrees Celsius for 1 hour. Acetone rinse may be substituted for heating. Store inverted or capped with foil in clean environment.
15. Detergent wash, hot tap water rinse. Drain dry. Oven or muffle furnace at 400 degrees Celsius for one hour. Acetone rinse. Store inverted or capped with foil in a clean environment.
16. Detergent wash, tap water, distilled water or solvent rinse, air dry (where appropriate) in an oven.
17. Rinse with last solvent used. Detergent wash, hot. Tap water rinse. Reagent water rinse. Drain dry. Oven or muffle furnace at 450 degrees Celsius for 1 hour. Acetone rinse may be substituted for heating. Store inverted or aluminum foil capped in clean environment.
18. Detergent wash, rinse with tap and distilled water, dry at 105 degrees Celsius for 1 hour before use.
19. Detergent wash, distilled water rinse. Optional treatment with hydrochloric acid (1+9).
20. Warm detergent solution wash, thorough rinse in tap and distilled water.
21. Optionally, all samples may be tested with lead acetate paper before pH adjustment in order to determine if sulfide is present. If sulfide is present, it can be removed by the addition of cadmium nitrate powder until a negative spot test is obtained. The sample is filtered and the NaOH is added to pH>12.
22. Samples should be filtered immediately on site before adding preservative for dissolved metals.
23. Thoroughly rinse with last solvent used. Hot water and detergent wash, thorough rinsing with dilute acid, tap and reagent water. Drain dry. Heat in oven or muffle furnace at 400 degrees Celsius for 1 hour. Thorough rinsing with acetone may be substituted for

300400

heating. Seal and store in clean environment. Store inverted or capped with aluminum foil.

24. Rinse with water or last solvent used. Detergent wash, tap rinse, redistilled acetone rinse, pesticide quality hexane rinse. Heat in muffle furnace at 400-500 degrees Celsius for 30 minutes to overnight. Store inverted or cover with aluminum foil.
25. Detergent wash, rinse in dilute HCl and then distilled water. Rinse with redistilled acetone rinse, pesticide quality hexane rinse. Heat in muffle furnace at 400-500 degrees Celsius for 30 minutes to overnight. Store inverted or cover with aluminum foil.
26. If HNO_3 cannot be used because of shipping restrictions, samples may be initially preserved by icing and immediately shipping to the laboratory. Upon receipt in the laboratory, the sample must be acidified with conc. HNO_3 to $\text{pH} < 2$. At time of analysis, sample container should be thoroughly rinsed with 1:1 HNO_3 ; washings should be added to sample.
27. Cleaning of all chambers and equipment shall be in accordance with the following procedures:

As soon after breaking down a test as is practical, rinse with acetone to remove organic compounds and then rinse twice with laboratory grade freshwater; and secondly, soak and wash with a warm synthetic detergent/laboratory grade freshwater solution, and then rinse with 50 degrees Celsius or warmer laboratory grade water; and

Finally, rinse with a fresh 5% hydrochloric or nitric acid solution, for the removal of metals and bases, and then rinse again with 50 degrees Celsius or warmer laboratory grade freshwater.

28. NJDEPE recommended holding time for sample extraction and analysis.
29. No test; calculated as total Kjeldahl Nitrogen minus Ammonia Nitrogen
30. Proposed under Safe Drinking Water Act - size of community dependent.
31. CFR 141 is under final rule to change from CFR 143.
32. Evidence indicates that some aromatic compounds, notably benzene, toluene and ethylbenzene are susceptible to rapid biodegradation under certain environmental conditions. Refrigeration alone may not be adequate to preserve these compounds in wastewaters for more than seven days. For this reason, a separate sample should be collected, acidified, and analyzed when these aromatics are to be determined.

Attachment 3

SW-846 Methods Trip and Field Blank Requirements

Parameter	Sample Container Volume	Preservation	Maximum Hold Time*	Analytical Methodology	Sample Container Cleaning
Volatile Organics	G vial Teflon lined septum 40ml	4 drops conc, HCl, cool 4°C	14 days	SW-846, 3d edition, Vol 1-B, GC 8010,8015 GC/MS 8240	5
Semi- Volatile Organics	Amber G, Teflon Lined Cap 1000ml	Cool, 4°C Dark	Extraction- 7 days Analysis- 40 days from extraction	SW-846, 3d edition, Vol 1-B,* GC/MS 8270	5
Organo- chlorine Pesticides and PCBs	As Above	As Above	As Above	SW-846, 3d edition, Vol 1-B, GC 8080	5
Organo- chlorine Pesticides	As Above	As Above	As Above	As Above	As Above
PCBs	As Above	As Above	As Above	As Above	As Above
Metals except Hg and Cr ⁺⁶	P Bottle, P Cap, P Liner 1000ml	HNO ₃ to pH<2	180 days	SW-846, 3d edition, Vol 1-A, 7000 series	9
Hg	As Above	As Above	28 days	As Above	9

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Attachment 3

SW- 846 Methods Trip and Field Blank Requirements

<u>Parameter</u>	<u>Sample Container Volume</u>	<u>Preservation</u>	<u>Maximum Hold Time*</u>	<u>Analytical Methodology</u>	<u>Sample Container Cleaning</u>
Total Petroleum Hydrocarbons	G, 1000ml	Cool, 4°C	7days	SW-846, 3d edition, Vol 1-C, Method 418.1	7

*Holding time begins at time of sample collection

CLP Methods Trip and Field Blank Requirements

<u>Parameter</u>	<u>Sample Container Volume</u>	<u>Preservation</u>	<u>Maximum Hold Time*</u>	<u>Analytical Methodology</u>	<u>Sample Container Cleaning</u>
Volatile Organics	G. Black phenolic plastic screw cap teflon- lined septum 40 ml	Cool. 4°C Dark	10 days	USEPA-CLP Statement of Work for Organic Analysis Multi-media Multi- Concentration (Doc.#OLM03.1)8/94	3
Semi- Volatile Organics	Amber G. Teflon Lined Cap 1000ml	Cool. 4°C Dark	Extraction- Continuous liquid-liquid extraction must be started within 5 days Analysis- days from VTSR*		As Above
Organo- chlorine Pesticides and PCBs	As Above	As Above	As Above		As Above
Organo- chlorine Pesticides	As Above	As Above	As Above		As Above
PCBs	As Above	As Above	As Above		As Above

CLP Method Trip and Field Blank Requirements

Parameter	Sample Container Volume	Preservation	Maximum Hold Time*	Analytical Methodology	Sample Container Cleaning
Inorganics except Hg and Cyanide	P Bottle, P Cap, P Liner 1000ml	HNO ₃ to pH<2	180 days	USEPA-CLP Statement of Work for Inorganic Analysis Multi-media Multi- Concentration (DOC#ILM03.O)	As Above
Hg	As Above	As Above	26 days		As Above
*Validated time of sample receipt (at the laboratory)					
Cyanide	As Above	NaOH to pH<2, 4°C until analyzed	12 days	As Above	As Above

ENVIROTECH RESEARCH SOP No. S102
STANDARD OPERATING PROCEDURE
FOR SAMPLE BOTTLE CONTROL AND CLEANING

doc: S102
Revision:

1. SCOPE and APPLICATION

- 1.1. The following procedure is used to receive precleaned sampling bottles, label the cases and store the bottles in a manner that facilitates using the oldest bottles first (stock rotation).

2. APPARATUS

- 2.1. Material Receiving Labels

3. PROCEDURE

- 3.1. All sampling bottles are purchased from a vendor, presently Eagle Picher, who cleans the containers as outlined below.

- 3.2. The Sample Receipt Login Technician is responsible for ordering bottles and maintaining the inventory of bottles

- 3.3. The sampling bottles are cleaned by either Procedure A, B or C. These procedures are as follows:

- 3.3.1. Wash Procedure A - used for all glass wide mouth jars and Boston Round bottles.

3.3.1.1. Bottles, liners and caps are washed in laboratory grade, non-phosphate detergent.

3.3.1.2. Rinsed three times with distilled water.

3.3.1.3. Rinsed with 1:1 nitric acid

3.3.1.4. Rinsed three times with ASTM Type 1 organic free water.

3.3.1.5. Oven dried for one hour.

3.3.1.6. Rinsed with hexane.

3.3.1.7. Oven dried for one hour.

- 3.3.2. Wash Procedure B - used for any bottles to contain samples for volatile organic analysis.

3.3.2.1. Bottles, septa and caps are washed in laboratory grade, non-phosphate detergent.

3.3.2.2. Rinsed three times with distilled water.

3.3.2.3. Rinsed three times with ASTM Type 1 organic free water.

3.3.2.4. Oven dried for one hour.

3.3.3. Wash Procedure C - used for all high density polyethylene bottles

3.3.3.1. Bottles, liners and caps are washed in laboratory grade, non-phosphate detergent.

3.3.3.2. Rinsed three times with distilled water.

3.3.3.3. Rinsed with 1:1 nitric acid

3.3.3.4. Rinsed three times with ASTM Type 1 organic free water.

3.3.3.5. Air dried.

- 3.4. Sample bottles are received in the loading dock area. Every case of bottles is labeled with a tag that bears the date the bottles are received and the individual who received them.
- 3.5. The sample bottles are transported to the sample bottle room which is in an organic free section of the laboratory. The newly received cases of bottles are placed in the rear of the racks which hold the bottles. The bottles with the oldest date of receipt are moved to the front of the rack so that they are consumed first.
- 3.6. With every new shipment of bottles, a bottle is randomly selected for each bottle type received. If a bottle type has potential use for more than one analysis, additional bottles are selected. These bottles are filled with analyte free water and are used to create the following days method blank for the analysis for which they will be used. If subsequent analysis produces any positive result, the entire shipment of bottle type is removed from inventory and subjected to another check. If this subsequent check confirms the first check, the entire shipment of bottle type is rejected and returned to the vendor. At no time are bottles to be issued to a client without undergoing this checking procedure.

ENVIROTECH RESEARCH SOP No. S100.2
STANDARD OPERATING PROCEDURE
FOR MAINTAINING SAMPLE CHAIN OF CUSTODY

doc: S100.2
Revision:

300409

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1. SCOPE and APPLICATION

- 1.1. The following procedure details all required aspects of maintaining and executing Chain of Custody control documents for environmental samples except for samples submitted under government contract.
- 1.2. Analysis requests from NJDEPE for analytical services in accordance with the X-26174 contract requires the use of NJDEPE forms 095 or 096 and NJDEPE form 077 for internal Chain of Custody described in Envirotech Research SOP No. S100.
- 1.3. This Chain of Custody procedure is designed to create a written record of everyone in custody of the sample from the time of collection to its disposal
- 1.4. A sample is in an individual's "custody" if it is in his actual physical possession or sight or if it is secured in a restricted area of limited access.

2. APPARATUS

Attachment 1, Custody Seal
Attachment 2, Chain of Custody
Attachment 3, Instructions for Chain of Custody
Attachment 4, Common Abbreviations for Laboratory Tests
Attachment 5, Lab Chronicle
Attachment 6, Internal Custody Record

3. PROCEDURE

- 3.1. Upon receiving a Request for Bottle Order, the Sample Custody Officer or his assistant prepares a sample shipment container in accordance with Envirotech Research SOP No. S101 and initiates an Envirotech Research Chain of Custody document for the contents of the cooler. A Custody Seal is used to seal each cooler. See Attachment 1 for an example Custody Seal.
- 3.2. The appropriate information is entered on the Envirotech Research Chain of Custody, including but not limited to container type, number of containers and preservation reagents. One Chain of Custody form may be used for the entire shipment of containers.

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- 3.3. The Sample Custody Officer or his assistant relinquishes the custody of the sampling container(s) to the sampling team by signing the first "Relinquished by" box on the bottom of the Chain of Custody document. A member of the sampling team signs the adjacent "Received by" box on the bottom of the form and assumes custody of the container(s).
- 3.4. Upon return to the laboratory, a member of the sampling team who assumed custody of the containers relinquishes custody of them back to the Sample Custody Officer or his assistant.
- 3.5. At this point, either a client Chain of Custody form or another Envirotech Research Chain of Custody form is initiated. Each sampling point is entered on one line. If the Envirotech Research Chain of Custody document is used and the total number of samples taken exceeds ten, then additional forms are added as required. An example of the Envirotech Research Chain of Custody form is given in Attachment 2. Instructions for the Chain of Custody are given in Attachment 3. Common abbreviations used to request laboratory analysis are given in Attachment 4.
- 3.6. The Sample Custody Officer or his assistant then checks the actual samples against the information on the Chain of Custody form. If there are any errors or discrepancies, they are corrected at this point in time and initialed. The custody of the samples is then signed from the sampling crew to the Sample Custody Officer or his representative and logged into the laboratory and placed in a locked refrigerator in accordance with Envirotech Research SOP No. S103.
- 3.7. For sampling containers received by common carrier, the shipping documents are to be retained to document their possession with the shipper and the Sample Custody Officer will accept custody as of the time the container is opened in the laboratory.
- 3.8. The completed Chain of Custody is placed in the Job Folder in the Document Control Area.
- 3.9. INTERNAL CHAIN OF CUSTODY
 - 3.9.1. After the samples have been logged in per Envirotech Research SOP S103, a Laboratory Chronicle is initiated for each sample received by the laboratory. An example is given in Attachment 5. An Internal Chain of Custody is initiated for each group of samples from the Job of similar matrix and method. An example is given in Attachment 6.

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The Laboratory Chronicle contains the client name, site name, sample number, matrix, date sampled and date received in the header. Along the left column, each analysis requested is listed. The Internal Custody Record tracks the samples through the laboratory and identifies who has custody of the sample or sample aliquot at any given time. The Lab Chronicle also records by whom and when preparation and analysis of each parameter is performed in addition to the Quality Assurance batch number for each parameter analyzed for the sample.

- 3.9.2. The Laboratory Chronicles are maintained in the Job Folder in accordance with Envirotech Research SOP No. D100.
- 3.9.3. The Internal Chain of Custody Records remain in the sample storage area and follow the samples as they are handled.

ATTACHMENT 1

1304	CUSTODY SEAL	
Person Collecting Sample _____	(signature)	Sample No. _____
Date Collected _____	Time Collected _____	1304

300413

Phone: (908) 549-3900 Fax: (908) 549-3679

CHAIN OF CUSTODY / ANALYSIS REQUEST

PAGE ____ OF ____

[illegible]

Special Instructions:

Water Metals Filtered (Yes/No)?

Relinquished by 1)	Company	Date / Time 	Received by 1)	Company
Relinquished by 2)	Company	Date / Time 	Received by 2)	Company
Relinquished by 3)	Company	Date / Time 	Received by 3)	Company
Relinquished by 4)	Company	Date / Time 	Received by 4)	Company

ATTACHMENT 2

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Instructions: Chain of Custody / Analysis Request Form

ENVIROTECH RESEARCH INC.
777 New Dumont Road
Edison, New Jersey 08817
Phone (908) 542-3900 Fax (908) 542-3675

Chain of Custody / Analysis Request

PAGE ____ OF ____

Name (for report and invoice) Mr. Robert Jones		Sample Name (Printed) Jobe Field		Site/Project Identification XYZ Chemical Company	
Company ABC Consulting, Inc.		P.O.# 12345		State (Location of site): NJ <input checked="" type="checkbox"/> NY <input type="checkbox"/> Other <input type="checkbox"/>	
Address 2464 Main Street		Analysis Turnaround Time Standard <input checked="" type="checkbox"/> Rush <input type="checkbox"/>		Regulatory Program ISRA	
City Edison		State NJ		Zip 08817	
Phone 908-555-1212		Fax 908-555-1515		LAB USE ONLY Project No: Job No: Sample Numbers	
Sample Identification		Date	Time	Matrix	No. of Cont.
Test Pit - 1	5/28/94	10:00	Soil	8	X X X X X
Test Pit - 2	5/28/94	10:10	Soil	8	X X X X X
Field Blast	5/28/94	11:00	Water	6	X X X X X
Preservation Used: 1 = ICE 2 = HCl 3 = H ₂ SO ₄ 4 = HNO ₃ 5 = NaOH 6 = Other: 7 = Other:		Soil: 1 1 1 1		Water: 2 1 4 3	
Special Instructions					
Requisitioned By 1: John Field	Company ABC Consulting, Inc.	Date + Time 5/28/94 12:00	Received By 1: Rob McGrady	Company Envirotech Research, Inc.	Water Metals Filtered (Yes/No)? No
Requisitioned By 2:	Company	Date + Time	Received By 2:	Company	
Requisitioned By 3:	Company	Date + Time	Received By 3:	Company	
Requisitioned By 4:	Company	Date + Time	Received By 4:	Company	

- Provide the name, address and phone and fax number of the person who is to receive the analytical report and invoice.
- Print the name of the sampler, the site/project name, the state the site is located in and the type of regulatory program under which the analysis falls. Please provide the Envirotech Quote/Project number with the Project Identification Information. If your company requires a purchase order number (P.O.#) for payment of laboratory services, please provide it in the noted box.
- Note the required analysis turnaround time. Standard analysis turnaround time for complex projects is approximately 15 to 20 work days. Standard turnaround time for other projects (i.e. VOAs, PHC, and most general chemistry) is approximately 10 to 15 work days. Rush analytical services will be provided upon request with the following surcharges applied to standard unit prices:
 2 Week Rush (10 work days) for a 25% surcharge;
 1 Week Rush (5 work days) for a 50% surcharge;
 Less Than 5 Work Day service for a 100% surcharge.
 Rush Total Petroleum Hydrocarbon testing is not subject to this surcharge policy and is offered faster and at lower rush price surcharges. Please see our price list for details.

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(Over)

4. List the analyses you would like performed under "Analysis Requested". Place one analysis per column starting at the left column. You may use common abbreviations. Please see our list of common abbreviations for laboratory tests.
5. Place the sample descriptions (as you wish them to appear in your laboratory report) in the Sample Identification column. Note the date of sampling, time of sampling, the sample matrix (soil/water) and the number of containers for each sample. **Place an "X" under the appropriate type of analysis for each sample to indicate your request for each required analysis.**
6. Note the preservation used for soil and water samples by placing the correct number code in each box. Most soil samples must be preserved by cooling to ice temperature (#1). Water preservatives are generally noted on the containers provided by the laboratory. Two separate lines are provided for soil and water preservation information so that both soil and water sample preservation information can be provided.
7. Place special instructions on the space provided. Also, note whether the any water samples being tested for metals have been field filtered.
8. The signature of the person who's name is printed in the "Samplers Name" box must appear in the first "Relinquished by" box. His/her company name must follow as well as the date and time of change in sample custody. The person receiving the samples must then sign and provide their company affiliation. This procedure must be followed each time samples change custody.
9. Please do not use the section noted "Lab use only" . This section is required by the laboratory for identification of laboratory samples.

300416

Common Abbreviations for Laboratory Tests

Priority Pollutants (PP)

PP - VOA - Priority Pollutant Volatile Organic Analysis with xylenes

PP - VOA + 10 - Priority Pollutant Volatile Organic Analysis with xylenes plus a GC/MS library search for up to 10 non-target compounds

PP - BN - Priority Pollutant Base/Neutral Extractable Organics

PP - BN + 15 - Priority Pollutants Base/Neutral Extractable Organics plus a GC/MS library search for up to 15 non-target compounds

PP - BNA - Priority Pollutant Base/Neutral and Acid Extractable Organics

PP - BNA + 25 - Priority Pollutant Base/Neutral and Acid Extractable Organics plus a GC/MS library search for up to 25 non-target compounds

PP - Metals - Priority Pollutant Metals (13 elements - As, Sb, Be, Cd, Cr, Cu, Ni, Pb, Hg, Se, Ag, Ti, Zn)

PP - PCB/Pest - Priority Pollutant Polychlorinated Biphenyls (PCBs) and Organochlorine Pesticides

PP + 40 - Priority Pollutants + 40 (PP-VOA+15, PP-BNA+25, PP-PCB/Pest, and PP-Metals)

PP - PAH - Priority Pollutant Polynuclear Aromatic Hydrocarbons

Target Compound List (TCL) and Target Analyte List (TAL):

TCL - VOA + 10 - Target Compound List Volatile Organic Analysis plus a GC/MS library search for up to 10 non-target compounds

TCL - BN + 10 - Target Compound List Base/Neutral Extractable Organics plus a GC/MS library search for up to 10 non-target compounds

TCL - BNA + 20 - Target Compound List Base/Neutral and Acid Extractable Organics plus a GC/MS library search for up to 20 non-target compounds

TAL - Metals - Target Analyte List Metals (23 elements - Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn)

TCL - PCB/Pest - Target Compound List Polychlorinated Biphenyls (PCBs) and Organochlorine Pesticides

TAL/TCL + 30 - Target Analyte List and Target Compound List +30 (TCL-VOA+10, TCL-BNA+20, TCL-PCB/Pest, TAL-Metals)

CN - Cyanide

EPA Contract Laboratory Program (CLP):

TCL/TAL Analysis is provided by the EPA's CLP statement of work. When CLP analysis is required, please clearly specify "CLP" analysis in the Special Instructions section. The laboratory will follow SW-846 methods for TCL and TAL analysis unless "CLP" analysis is specified.

Waste Characteristic Testing:

TCLP - Toxicity Characteristic Leaching Procedure (Full TCLP), Including:

1. TCLP Zero Headspace Extraction
2. TCLP Inorganic and Semivolatile Organic Extraction
3. TCLP-VOA - TCLP Volatile Organics Analysis
4. TCLP-BNA - TCLP Base/Neutral and Acid Extractable Organics Analysis
5. TCLP Metals
6. TCLP-Pest - Pesticides
7. TCLP-Herb - TCLP Herbicides

For individual TCLP fractions note the specific test required, i.e. TCLP-VOA or TCLP-Metals

I,C,R - Ignitability, Corrosivity, and Reactivity (for Cyanide and Sulfide)

PCB - Polychlorinated Biphenyls

PHC - Total Petroleum Hydrocarbons

Volatile Organic Profiles:

Ac & Ac - Acrolein and Acrylonitrile by methods 603/8030

BTEX - Benzene, Toluene, Ethylbenzene and Xylenes by methods 602/8020

BTEX by MS - Benzene, Toluene, Ethylbenzene and Xylenes by methods 624/8240

MTBE - Methyl tertiary butyl ether

TBA - Tertiary butyl alcohol

DIPE - Diisopropylether

Petroleum Discharge Evaluation Analyses:

Fingerprint - GC-FID Hydrocarbon Product Identification

GRO - Gasoline Range Organics (PHC by GC)

DRO - Diesel Range Organics (PHC by GC)

3650 Cleanup - Acid-Base Partition Cleanup

3611 Cleanup - Alumina Column Cleanup

Individual Metals:

Al Aluminum	Co Cobalt	P-ICP Phosphorus by ICP
B Boron	Cu Copper	Se Selenium
Sb Antimony	Fe Iron	Ag Silver
As Arsenic	Au Gold	Na Sodium
Ba Barium	Pb Lead	Sr Strontium
Be Beryllium	Mg Magnesium	Tl Thallium
Cd Cadmium	Mn Manganese	Sn Tin
Ca Calcium	Hg Mercury	Ti Titanium
Cr Chromium, Total	Mo Molybdenum	V Vanadium
Cr⁶⁺ Chromium, Hexavalent	Ni Nickel	Zn Zinc
	K Potassium	

General Chemistry:

Alk - Alkalinity, as CaCO₃

Br - Bromide

CO₂ - Carbon Dioxide, Free

CEC - Cation Exchange Capacity

COD - Chemical Oxygen Demand

Cl - Chloride

CN - Cyanide

F⁻ - Fluoride

Hrd - Hardness

Herb - Herbicides (2,4-D and 2, 4, 5-TP)

NH₃ - Ammonia Nitrogen

NO₃ - Nitrate Nitrogen

NO₂ - Nitrite Nitrogen

O & G - Oil and Grease, Gravimetric

O & G, IR - Oil and Grease by IR

ORP - Oxidation Reduction Potential

PO₄ - Orthophosphate

P - Phosphorus, Total

TDS - Total Dissolved Solids

TSS - Total Suspended Solids

TS - Total Solids

TVS - Total Volatile Solids

SS - Settleable Solids

Sp. Cond. - Specific Conductance

SO₄ - Sulfate

S²⁻ - Sulfide

TOC - Total Organic Carbon

PHC - Total Petroleum Hydrocarbon

LABORATORY CHRONICLE
ENVIROTECH RESEARCH, INC.
 777 NEW DURHAM ROAD, EDISON, NJ 08817
 (908) 549-3900

Client: ENVIROTECH RESEARCH, INC.Date Sampled: 6/9/94Site: XYZ Chemical Co.Date Received: 6/9/94Matrix: SOLIDJob No.: G780Sample No.: 98318

Analytic Parameter	Extraction Date	Extractor's Name	Analysis Date	Analyst's Name	QA Batch
PPVOA+15	--	--	6/14/94	Sue Purge	4385
PPBNA+25	6/11/94	John Tech	6/15/94	Dave Chemist	5678
PP PEST/PCB	6/11/94	Bob Smith	6/16/94	Tom Jones	6789
ANTIMONY	6/10/94	Jim Nitric	6/17/94	Jane Doe	7890
ARSENIC	↓	↓	↓	↓	↓
BERYLLIUM	↓	↓	↓	↓	↓
CADMIUM	↓	↓	↓	↓	↓
CHROMIUM	↓	↓	↓	↓	↓
COPPER	↓	↓	↓	↓	↓
LEAD	↓	↓	↓	↓	↓
MERCURY	6/11/94	Joe Base	6/11/94	Joe Base	↓
NICKEL	6/10/94	Jim Nitric	6/17/94	Jane Doe	↓
SELENIUM	↓	↓	↓	↓	↓
SILVER	↓	↓	↓	↓	↓
THALLIUM	↓	↓	↓	↓	↓
ZINC	↓	↓	↓	↓	↓

300419

ATTACHMENT 6

INTERNAL CHAIN of CUSTODY RECORD

Job No.: _____

Fraction: _____

Client: _____

Matrix: _____

Site: _____

Date Rec'd: _____

Sample Nos.: _____

In Custody Of

Date

Time

SSA

SSA=Secured Storage Area

300420

ENVIROTECH RESEARCH SOP No. S103
STANDARD OPERATING PROCEDURE FOR SAMPLE RECEIPT,
LOGIN, IDENTIFICATION, STORAGE and
MITIGATION of SAMPLE and LABORATORY CONTAMINATION

doc: S103

Revision: Number 3-July 11, 1995

300421

ENVIROTECH RESEARCH, INC.

1. SCOPE and APPLICATION

- 1.1. The following procedure details the steps required to receive and uniquely identify samples received at the laboratory. This procedure is used in conjunction with Envirotech Research SOP No. S100 which specifies internal and external Chain of Custody procedures.
- 1.2. This SOP addresses sample storage and security procedures performed by the Sample Custody Officer or his Assistant.
- 1.3. This SOP further addresses procedures and precautions which eliminate or at worst minimize contamination of samples from other samples or from the laboratory.

2. APPARATUS

- 2.1. Sample Log Book
- 2.2. Preprinted Sample Identification Labels
- 2.3. 0-14 pH Paper
- 2.4. Calibrated Thermometer
- 2.5. Cooler Temperature Logbook
- 2.6. Gloves, Labcoat, Safety Glasses

3. PROCEDURE

- 3.1. Sample Login and Storage
 - 3.1.1. A checklist with all steps for sample receipt and login is given as Attachment 1. The initial acceptance of samples at Envirotech Research, Inc. is performed by the Sample Custody Officer or his assistant. Samples may enter the laboratory only at the designated sample receiving area. Samples which have an odor or are suspected to be high in concentration are logged in under a fume hood.
 - 3.1.2. The containers are checked for damage and appropriate volume, container type, and preservation for the proposed analysis by the Sample Custody Officer or his assistant. Broken or damaged containers and samples which are not in the proper container are not accepted.

300422

- 3.1.3. To mitigate sample cross contamination, the lid on every sample bottle is tightened down if it is not already so and any sample bottle with sample residue on its exterior surface is rinsed off in the adjacent sink. If the sample bottle has residue which is not removable, the sample bottle is placed in a ziplock bag to eliminate any potential contact with other samples.
- 3.1.4. If the containers do not have appropriate label information, the Sample Custody Officer or his assistant will complete an Envirotech sample label for each container.
- 3.1.5. When the Sample Custody Officer or his assistant determines that the samples are in satisfactory condition and are properly preserved the chain-of-custody form(s) which accompanied the samples is checked against the samples for accuracy and executed in accordance with Envirotech Research SOP No. S100.
- 3.1.6. The Sample Custody Officer or his assistant assigns an Envirotech Research, Inc. sample number to each sample and a job number for each sample submission. The job number is assigned to a group of samples received at one time which are to be analyzed and reported in one report to one client. The sample number is a five digit number which applies to every fraction of an individual sample. One sample is defined as the sum of all material taken from a specific point at a particular time. For example, multiple containers filled at the same surface location, depth and time for volatile organics and metals analysis constitutes one sample. One sample may therefore consist of one or more containers. As another example, material removed from the same surface location but at different depths constitutes more than one sample and must have a separate sample identification. Two well water samples taken at the same location but at different times are also separate samples.
- 3.1.7. A preprinted sticker with the sample number is affixed to each sample container and its lid. The sample and job numbers are also printed on the chain-of-custody form.
- 3.1.8. The Sample Custody Officer or his assistant makes an entry in the bound Sample Log Book for each sample received. Each entry contains the sample number, job number, date received, date sampled, the number of containers for the sample, the matrix, the client's identification for the sample, the parameters to be analyzed, client name, the refrigerator identification where the samples are secured and any additional comments. An example page from the Sample Log Book is included as Attachment 2.

- 3.1.9. Sample preservation is recorded for each job documenting the condition of the samples upon receipt and the pH of any samples which required preservation noting any adjustments made at the lab. The temperature of the incoming samples is taken from the Temperature Monitor Bottle and is recorded in the Cooler Temperature Log. If the temperature of the incoming samples is too high, the client is immediately notified and the laboratory must receive guidance from the client if analysis is to proceed. Samples requiring preservation are checked with pH paper (0-14 range, 0.5 sensitivity). This information is recorded in the Sample Login Book on the back of the page that the job is being logged in on. Any samples that are improperly preserved are adjusted and documented on the outside of the Job Folder. Deficiencies will be noted in a non-conformance statement accompanying each sample report.
- 3.1.10. The Sample Custody Officer or his assistant secures the sample containers for analyses other than VOAs in the secured limited access sample storage refrigerators. Refrigerator A is used for any samples which are pure product or are suspected to be high concentration samples. The temperature of the sample storage refrigerators is maintained at 4°C and is monitored and recorded daily.
- 3.1.11. All sample bottles which contain samples that will be analyzed for volatile organics are brought to the organic free area in the VOA laboratory. Sample containers for VOA analysis are secured in locked limited access sample storage refrigerators. Sample bottles which contain solid samples that will be analyzed for volatile organics are screened by an Hnu. If a response is detected, the sample containers are placed in the separate high concentration volatile organics refrigerator located in the VOA lab. Water samples and solid samples which do not screen are placed in one of the low level volatile organics refrigerators located in the VOA lab.
- 3.1.12. After the samples are logged in, internal sample tracking forms are initiated in accordance with ETR SOP S100. Samples to be analyzed for NJDEPE Contract X-26174 require NJDEPE form 077 as specified by SOP S100.
- 3.1.13. The Sample Custody Officer or his assistant enters sample specific information for each job into the laboratory sample tracking system database. This information consists of the client, job number, date received and sampled and number of analyses for each parameter.
- 3.1.14. Completed chain-of-custody forms and the internal sample tracking forms are delivered to the Laboratory Data Management Office and are

handled in accordance with Envirotech Research SOP No. D100 for Data Management and Handling Procedures.

3.2. Procedures and Measures to Mitigate Sample Contamination

3.2.1. Section 3.1 of this SOP outlines the measures taken to ensure that samples do not cross contaminate one another. These steps are taken during the login procedure and are repeated as the samples are handled. Samples for volatile organics analysis are segregated immediately after login to an isolated area of the laboratory that is free of volatile organics. They are further segregated after they are screened to isolate higher concentration samples from low level samples. Sample bottles which have material on the exterior of the bottle are decontaminated in the sink located in sample receiving. If this is not adequate, the sample bottle is placed in a ziplock bag so it cannot come in contact with other samples. Sample bottles which contain pure product or are suspected to be high in concentration are isolated in Refrigerator A.

3.3. Procedures and Measures to Mitigate Laboratory Contamination

3.3.1. Envirotech Research's laboratory has been designed to isolate sample storage, sample bottle storage and volatile organics analysis areas from potential sources of contamination by physically isolating the areas where solvents are permitted and organic free areas using full height solvent containment walls, by specially designed air handling systems which prevent ambient lab air from being transported to areas where volatile organics samples are stored and analyzed and by constantly maintaining air pressure control to ensure that areas which are designated as organic free are always under positive pressure.

3.3.2. Laboratory contamination is prevented by screening samples to insure that unacceptably high concentration samples do not contaminate analytical instruments and result in cross contamination between analyses. VOA samples are screened prior to analysis on a GC-FID with a Tekmar heated headspace sample introduction system. Semivolatile organic samples are also screened by GC-FID.

3.3.3. The presence of laboratory contamination is evaluated with the use of laboratory "blanks" as required by applicable methods. If unacceptable blank contamination is present (i.e. three times the CRQL for methylene chloride, acetone, benzene, toluene or phthalates; or above the CRQL for other parameters) then analysis is halted until the source of contamination is located and the system brought under control.

ENVIROTECH RESEARCH, INC.

3.4. Procedure for Documenting and Assessing Sample and Laboratory Contamination and Cleanup

- 3.4.1. Sections 3.1 and 3.2 describe cleanup procedures used to prevent cross contamination from samples. A record of sample bottles which contain pure product or are suspected to be high in concentration that are isolated in Refrigerator A is made in the Sample Receiving Log Book.
- 3.4.2. Documentation of the results of all VOA and Semivolatile Organic Screening analyses are retained in the appropriate Job Folder along with the results of blank analyses.
- 3.4.3. Each Department Supervisor evaluates the results of blank analyses for contamination and screening analyses for consistency with final analytical results. Laboratories are maintained in clean and orderly way to prevent contamination of samples. If unacceptable blank contamination is noted the applicable Department Supervisor will take the necessary cleanup action.
- 3.4.4. Documentation is provided in the Case Narrative if unacceptable blank contamination is noted describing factors related to any analysis that was halted until the source of unacceptable blank contamination was located and the system brought back under control.
- 3.4.5. If an accident causes a spill or leak in the laboratory action will be taken as specified in the Envirotech Research, Inc. Contingency Plan and Emergency Procedures which is provided in Health and Safety SOP No. M106.

3.5. Procedures for After Hours Receipt of Samples

- 3.5.1. The Sample Control Officer or his Assistant is generally available to receive samples on work days until 7:00 p.m. When there is a need for after hours sample receipt and storage the Sample Control Officer or his Assistant will either:
 - a) Remain at the laboratory to receive samples if notified in advance of the expected time of sample delivery, or;
 - b) Return to the laboratory to receive samples from the NJDEPE upon request when telephoned at the number given below for Mr. Rob McGrady
924-3630

3.6. Procedures to Flag Rush or Short Holding Time Samples

300426

3.6.1. Rush samples and samples with short holding times are flagged at four points in the login procedure:

- a) With the sample's entry in the Sample Log Book;
- b) In the sample tracking system database;
- c) On the sample scheduling sheets in the Laboratory Data Management Office;
- d) In red ink on the top of the Job Folder that contains all documents that relate to the samples.

3.6.2. For short holding time samples the Sample Control Officer or his Assistant will also verbally notify the person assigned to start the analysis or their Department Supervisor so that they are aware that samples have been received that require special handling.

ENVIROTECH RESEARCH, INC.

Attachment 1

Sample Receipt and Login Checklist

Yes No

- | | | |
|---|---|---|
| — | — | 1. Was custody seal on cooler intact? |
| — | — | 2. Was cooler temperature recorded? |
| — | — | 3. Were all samples in good condition? |
| — | — | 4. Were samples labeled? |
| — | — | 5. Were sample container lids tightened and any sample residue rinsed off the outside of the container? |
| — | — | 6. Was chain of custody record form completed? |
| — | — | 7. Did number of samples and information on sample labels correspond to number of samples and information on the chain of custody record form? |
| — | — | 8. Did client relinquish samples to the Sample Custody Officer by signing the chain of custody record form in the space provided with the date and time? |
| — | — | 9. Did Sample Custody Officer receive the samples by signing the chain of custody record form in the space provided with the correct date and time? |
| — | — | 10. Did client receive a copy of the properly executed chain of custody record? |
| — | — | 11. Were the sample containers labeled with their laboratory sample number on the side and top? |
| — | — | 12. Were the job number and sample numbers printed on the chain of custody record form? |
| — | — | 13. Was an entry made in the Sample Log Book with all necessary information (i.e. sample number, job number date received, date sampled, number of containers matrix, client I.D., parameters, client name, preservation refrigerator location and any comments)? |
| — | — | 14. Were solid samples requiring volatile organics analysis screened with the HNU in the VOA laboratory? |
| — | — | 15. Were samples requiring volatile organics analysis stored in either the high concentration or low concentration refrigerator in the VOA laboratory? |
| — | — | 16. Were all other samples secured in a refrigerator? |
| — | — | 17. Were sample tracking forms initiated? |

300428

ENVIROTECH RESEARCH, INC.

Attachment 1

Sample Receipt and Login Checklist

Yes No

___ ___

18. Was the job entered into the laboratory sample tracking data base with all necessary information (client, job number date received, date sampled and number of analyses for each parameter)?

___ ___

19. Were completed chain of custody record forms and Internal sample tracking forms delivered to the Laboratory Data Management Office?

Job No. _____ Signed _____ Date _____

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26					Attachment 1				27
Sample #	ID	Client ID	Head of	Date Rec'd	Date Sampled	MATRIX	Parameters/Client	# of Conf.	Fridge
68736	B947	SS1	GA	6/14/02	6/25	Soil	PHC	1	N
68737	↓	SS2	↓	↓	↓	↓	↓	↓	↓
68738	↓	SS3	↓	↓	↓	↓	↓	↓	↓
68739	↓	SS4	↓	↓	↓	↓	↓	↓	↓
68740	B948	G-S1	Rm	6/15	6/25	Sess	Full TSP, PM ₁₀ , PM _{2.5} , Fecal Coliform, S-Enterococcus	2	B
68741	↓	G-S2	↓	↓	↓	↓	↓	2	↓
68742	B949	MW-300-1	Rm	6/16	6/25	H ₂ O	MeU, (w)	3	VCA
68743	↓	MW-300-2	↓	↓	↓	↓	↓	↓	↓
68744	↓	MW-300-3	↓	↓	↓	↓	↓	↓	↓
68745	↓	TB	↓	↓	↓	↓	↓	1	↓
68746	B950	P-1S	Rm	6/26	6/25	H ₂ O	PM ₁₀ , TSP, Cr ⁶⁺ , TDS, Cl ⁻ , SO ₄ ²⁻		D
68747	↓	P-1D	↓	↓	↓	↓	↓		↓
68748	↓	P-10(1)	↓	↓	↓	↓	↓		↓
68749	↓	P-2SD	↓	↓	↓	↓	↓		↓
68750	↓	P-6S	↓	↓	↓	↓	↓		↓
68751	↓	P-6D	↓	↓	↓	↓	↓		↓
68752	↓	P-2SS	↓	↓	↓	↓	↓		↓
68753	↓	P-LS (OSM)	↓	↓	↓	↓	↓		↓
68754	↓	P-1D (OSM)	↓	↓	↓	↓	↓		↓
68755	↓	P-1D (1) (OSM)	↓	↓	↓	↓	↓		↓
68756	↓	P-2SD (OSM)	↓	↓	↓	↓	↓		↓
68757	↓	P-6S (OSM)	↓	↓	↓	↓	↓		↓
68758	↓	P-6D (OSM)	↓	↓	↓	↓	↓		↓
68759	↓	P-2SS (OSM)	↓	↓	↓	↓	↓		↓
68760	D951	OH-0625-1	OH/SC	6/26	6/25	Soil	PHC - 24 Hour Rain	1	G
68761	↓	-2	↓	↓	↓	↓	↓	↓	↓
68762	↓	-C	↓	↓	↓	↓	↓	3	↓
68763	B952	K-0625-1					PHC - 24 Hour Rain	1	↓
68764	↓	-2	↓	↓	↓	↓	↓	↓	↓
68765	↓	-3	↓	↓	↓	↓	↓	↓	↓
68766	↓	-C	↓	↓	↓	↓	↓	3	↓

ENVIROTECH RESEARCH SOP No. M100
STANDARD OPERATING PROCEDURE
FOR PREPARATION, PURITY and STORAGE of
REAGENTS and STANDARDS

doc: M100
Revision:

300431

1. INTRODUCTION:

- 1.1. The following procedure is written to address laboratory procedures for documenting the preparation, purity/traceability and storage of reagents and standard reference materials. In all areas of the laboratory, it is each department's supervisors responsibility to maintain records (bound notebooks) of all reagents and standard reference materials used in his/her area of responsibility.

2. STORAGE:

- 2.1. All reagents, solvents, bulk chemicals, neat materials and primary reference standards are "logged in" by writing the date received into the laboratory directly on the container. In addition, when a reagent, solvent, bulk chemical, neat material or primary reference is opened for use, it is dated and initialed by the analyst. Bulk dry reagents are stored in the balance room located adjacent to the glassware washroom in the rear of the laboratory. Bulk solvents are stored in the solvent storage room adjacent to the shipping/receiving dock located in the rear of the building. In the event of an accidental spill or container failure the floor of this storage areas is sealed to 6 inches above floor level with a Sentry Polymer Semstone 245 coating. Bulk acids are stored in a "corrosives" storage cabinet located in the solvent storage room. An exhaust fan operates 24 hours in this area to eliminate any build up of solvent or acid fumes. Detailed procedures for the storage of working reagents and standard reference materials used in routine sample analysis are addressed in each relevant analytical SOP.

3. PURITY OF STANDARDS AND REAGENTS:

- 3.1. The purity or grade of reagents used for testing purposes in the laboratory are method specific. Each analytical method has unique requirements and specifications for reagents and standards used (i.e. pesticide residue analysis requires the use of pesticide grade solvents while volatile organic analysis requires purge and trap grade methanol). These requirements are detailed in Section 3 (Reagents) of each analytical SOP.
- 3.2. In all instances, existing stocks of chemicals and reagents must be consumed or disposed of upon expiration prior to introducing a new lot or source of materials into the laboratory. Once a new materials is introduced into a testing procedure standard QA/QC procedures such as analysis of reagent blanks, matrix spike, matrix spike duplicate and blank spikes will make

obvious any substandard performance of new materials. Gross changes in performance can be seen and corrected at the bench level upon review of the above listed QC checks. Subtle changes are best viewed by tracking these QC check parameter with Shuhart Charts. These charts are updated monthly and distributed to the appropriate lab supervisors.

4. PREPARATION OF REAGENTS AND STANDARDS:

- 4.1. The actual mechanics of preparing laboratory reagents and standard reference materials are detailed in each analytical SOP.
- 4.2. At a minimum all reagents and solutions must be labeled to indicate identity, when applicable titer, strength or concentration, diluent, preparation and expiration dates. The dates are used to cross reference working standards to the bound logbook entry. Upon preparation or opening of a pre-prepared standard solution, the following information is entered into a bound laboratory notebook (Identity and source of neat material or purchased stock solution, lot number if applicable, concentration, diluant, date prepared or placed in service, expiration date, analyst responsible for preparation and a record of all weights and dilutions used). Each page of the notebook must be signed by both the analyst preparing the reagent or standard and authenticated with the signature of his/her immediate supervisor.

ENVIROTECH RESEARCH SOP No. M102
STANDARD OPERATING PROCEDURE
FOR PREVENTIVE MAINTENANCE and CALIBRATION PROCEDURES
FOR ALL ANALYTICAL INSTRUMENTS and ANCILLARY EQUIPMENT

doc: M102
Revision:

300434

1. SCOPE and APPLICATION

- 1.1. The following procedure outlines the steps taken to ensure that instruments and ancillary equipment are in condition to perform their respective functions.

2. PROCEDURE

- 2.1. Analytical Instruments - The maintenance procedures, calibration procedures and tuning procedures which are carried out by analysts are covered in detail in the analytical SOPs. Every analytical instrument is covered by a service contract which calls for immediate service from the vendor should a failure occur. In addition to covering the instrument hardware, the software which controls the instruments is also covered by a maintenance contract. The department supervisor is responsible for the maintenance of the instruments within his laboratory. All information related to the calibration and maintenance of analytical instruments will be recorded in an individual laboratory notebook.

- 2.2. Ancillary Equipment - The inorganic laboratory supervisor is responsible for all the ancillary equipment listed below except for the GC items which are the responsibility of the GC Supervisor. In addition to routine instrument maintenance provided by manufacturer's maintenance contracts and software services, Envirotech will perform the following checks to insure that ancillary equipment and instrumentation are capable of functioning properly:

2.2.1. Analytical Balances

- 2.2.1.1. The balance is to be certified and checked once a year by a balance servicing company.

- 2.2.1.2. The analytical balance is to be checked once per month with class S weights, over the range of 10 milligrams to 30 grams.

- 2.2.1.3. All pertinent information will be recorded in a bound log book.

2.2.2. pH Meters

- 2.2.2.1. Meters are to be standardized against two buffers that bracket the pH of the sample.

2.2.2.2. The electrodes will be immersed in an appropriate buffer or water when not in use, and filled with an appropriate filling solution specified by the manufacturer.

2.2.2.3. A daily check of the pH meter will be made after calibration by setting the meter to pH 7.00 with a buffer standard and then with no further adjustment, reading pH buffer standards of pH 4.00 and 10.00 and recording the actual readings in a bound log book.

2.2.3. Spectrophotometers

2.2.3.1. A quarterly calibration of the Sequoia Turner Model 340 Spectrophotometer will be performed for determinations including cyanide and phenols.

2.2.3.2. The wavelength observed, date of check and analyst's name will be recorded in a bound log book.

2.2.4. Drying Ovens

2.2.4.1. The temperature of each drying oven will be recorded in a bound log book daily or for each day the oven is in use.

2.2.5. Refrigerators

2.2.5.1. The temperature of each refrigerator shall be recorded daily in a bound notebook by reading an in-place thermometer immersed in liquid on a shelf of the refrigerator.

2.2.6. Thermometers

2.2.6.1. All glass thermometers will be verified yearly by comparing the readings of these thermometers with a NBS traceable certified thermometer. Each thermometer will be identified and a record will be maintained including thermometer identification, the temperature of the certified thermometer, the temperature of the

thermometer being verified, date of verification and analyst who performed verification.

2.2.7. Gas Chromatograph Detectors

2.2.7.1. A record will be maintained for each detector with the serial number, date of installation, and background current profiles obtained at the time of installation.

2.2.8. Gas Chromatograph Columns

2.2.8.1. A record containing column ID number, date of packing or purchase, liquid phase identity and lot number of precoated column packing, conditioning temperature, flow rate and number of hours, length and shape of column, background current profiles and date of silation of column will be maintained for each column.

Analytical Methods

Envirotech Research, Inc. performs analyses using EPA methodology and other published authoritative methods. A detailed description of our procedures for each method are found in our analytical standard operating procedures manual

The following analytical methods summary provides a listing of analytical methods routinely offered by Envirotech Research, Inc. as of November 1995. In addition, this summary provides a listing of major groups of analyses and analytical packages routinely offered. Additional methods are offered for special projects upon request.

The table provided below gives a summary of the pages that follow.

Methods and Parameters Contents Summary

1. Priority Pollutants, Major Groups and Packages
2. TCL and TAL, Major Groups and Packages
3. EPA Contract Laboratory Program Methods
Hazardous Waste Classification Analyses
4. Volatile Organic Analysis Profiles
5. Metals Analyses, Individual Metals and Packages
6. General Chemistry
7. Petroleum Discharge Evaluation Analyses

Priority Pollutant Major Groups and Packages

600 Series Methods for Water and Wastewater
SW-846 Methods for Soil and Solid Waste

Parameter	Method Water/Soil
Priority Pollutant Volatile Organics with Xylenes (VOA)	624/8240
Priority Pollutant Volatile Organics +15 with Xylenes (VOA+15)	624/8240
Priority Pollutant Volatile Organics +15 with Xylenes, MTBE and TBA	624/8240
Priority Pollutant Base/neutral Extractable Organics (BN)	625/8270
Priority Pollutant Polynuclear Aromatic Hydrocarbons (PAHs)	625/8270
Priority Pollutant Base/neutral Extractable Organics +15 (BN+15)	625/8270
Priority Pollutant Base/neutral and Acid Extractable Organics (BNA)	625/8270
Priority Pollutant Base/neutral and Acid Extractable Organics +25 (BNA+25)	625/8270
Polychlorinated Biphenyls (PCBs)	608/8080
Priority Pollutant Pesticides & PCBs (Pest/PCB)	608/8080
Priority Pollutant Metals (PP Metals) 13 elements: As, Sb, Be, Cd, Cr, Cu, Ni, Pb, Hg, Se, Ag, Ti, Zn	200 Series/6010&7000
Full Priority Pollutants (VOA, BNA, PestPCB, and Metals)	
Full Priority Pollutants +40 (VOA+15, BNA+25, Pest/PCB, Metals)	

**Target Compound List (TCL) Organics and
Target Analyte List (TAL) Metals Major Groups and Packages**

600 Series Methods for Water and Wastewater
SW-846 Methods for Soil and Solid Waste

Parameter	Method Water/Soil
TCL Volatile Organics with Xylenes	624/8240
TCL Volatile Organics +10 with Xylenes	624/8240
TCL Volatile Organics +10 with Xylenes, MTBE and TBA	624/8240
TCL Base/neutral Extractable Organics	625/8270
TCL Base/neutral Extractable Organics +10	625/8270
TCL Base/neutral and Acid Extractable Organics	625/8270
Base/neutral and Acid Extractable Organics +20	625/8270
TCL Pesticides & PCBs	608/8080
TAL Metals 23 elements: Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn	200 Series/6010&7000
Cyanide	335.2
Full TCL Analysis Package (VOA, BNA, PestPCB)	
Full TCL+30 Analysis Package (VOA+10, BNA+20, PestPCB)	
Full TAL & TCL Analysis Package (VOA, BNA, Pest/PCB, Metals CN)	
Full TAL & TCL+30 Analysis Package (VOA+10, BNA+20, Pest/PCB, Metals, CN)	

300440

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USEPA Contract Laboratory Program (CLP)

Analysis and reporting is provided as specified in the 3/90 CLP Statement Of Work (SOW) Methodology for Organics Analysis Multi-Media, Multi-Concentration, document number OLM03.1

Metals and Cyanide analysis and reporting is provided as specified in the CLP SOW Methodology for Inorganic Analysis Multi-Media, Multi-Concentration, document ILM03.0

Parameter	Matrix
CLP Target Compound List (TCL):	
CLP-TCL Volatile Organics +10	Water or Soil
CLP-TCL Semivolatile Organics +20	Water or Soil
CLP-TCL Pesticides & PCBs	Water or Soil
Target Analyte List (TAL):	
Target Analyte List Metals 23 elements: Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn	Water or Soil
Cyanide	Water or Soil
CLP-TCL +30 Organics Package	Water or Soil
Full CLP-TAL & TCL +30 Package	Water or Soil

When CLP analysis is required, please specify "CLP" analysis on the Chain-of-Custody record provided with your samples.

Prices include CLP full format laboratory deliverable reports.

CLP methods require site specific quality assurance samples. With each group of up to 20 environmental samples provided over a period of 14 days or less, a matrix spike and matrix spike duplicate are required, resulting in two billable samples.

300441

Waste Characteristic Testing

Parameter	Method
-----------	--------

Toxicity Characteristic Leaching Procedure (TCLP):

1. TCLP Zero Headspace Extraction	1311
2. TCLP Inorganic and Semivolatile Organic Extraction	1311
3. TCLP Volatile Organics Analysis	8240
4. TCLP Base/neutral and Acid Extractable Organics Analysis	8270
5. TCLP Metals Analysis	6010/7471
6. TCLP Pesticides and Herbicides	8080/8150

Other RCRA Characteristic Tests:

7. Ignitability	1020
8. Corrosivity	9045
9. Reactivity (Cyanide and Sulfide)	SW-846 Chapter 7.3

Other Waste Classification Tests:

10. Total Petroleum Hydrocarbons (PHC)	418.1
11. Polychlorinated Biphenyls (PCBs)	8080

Waste Classification Packages		
Full TCLP	Items 3-6, Items 1-6,	Water Solid
Full TCLP, RCRA Tests, PHC & PCBs	Items 3-11 Items 1-11	Water Solid

300442

Volatile Organic Profiles

Gas Chromatography	
Parameter	Method Water/Soil
•Acrolein & Acrylonitrile (GC-FID)	603/8030
•Alcohols or Glycols (GC-FID)	8015
•Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) (GC-PID)	602/8020
•To add MTBE, TBA or DIPE to a BTEX analysis add \$10 per compound	
•To add Naphthalene to a BTEX analysis add \$20	
•Purgeable Aromatics (GC-PID)	602/8020
•Purgeable Halocarbons (GC-ELCD)	601/8010
•Purgeable Halocarbons and Aromatics (GC-PID/ELCD)	601&602/8021
•Volatile Organics in (Drinking) Water (Capillary GC-PID/ELCD)	502.2

Gas Chromatography/Mass Spectrometry	
Parameter	Method Water/Soil
•Purgeable Organics in (Drinking) Water (Capillary GC/MS)	524.2
•Priority Pollutant Volatile Organics with Xylenes	624/8240
•Priority Pollutant Volatile Organics +15 with Xylenes	624/8240
•Priority Pollutant Volatile Organics +15 with Xylenes, MTBE and TBA	624/8240
•TCL Volatile Organics with Xylenes	624/8240
•TCL Volatile Organics +10 with Xylenes	624/8240
•TCL Volatile Organics +10 with Xylenes, MTBE and TBA	624/8240
•TCL Volatile Organics +10	CLP-SOW

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Metals Analyses

Individual Metals

Parameter	Method Water/Soil	Parameter	Method Water/Soil
Al Aluminum	200.7/6010	Mg Magnesium	200.7/6010
Sb Antimony	204.2/6010	Hg Mercury	245.1/7471
As Arsenic	206.2/7060	Mo Molybdenum	200.7/6010
Ba Barium	200.7/6010	N Nickel	200.7/6010
Be Beryllium	200.7/6010	K Potassium	200.7/6010
Cd Cadmium	200.7/6010	Se Selenium	270.2/7740
Ca Calcium	200.7/6010	Ag Silver	200.7/6010
Cr Chromium, Total	200.7/6010	Na Sodium	200.7/6010
Co Cobalt	200.7/6010	Tl Thallium	279.2/7841
Cu Copper	200.7/6010	Sn Tin	200.7/6010
Fe Iron	200.7/6010	Ti Titanium	200.7/6010
Pb Lead	239.2/6010	V Vanadium	200.7/6010
		Zn Zinc	200.7/6010

- A **digestion fee** is charged once per sample in addition to the analysis fee listed above for each individual metal.
- No digestion fee is charged for Mercury or Metals Packages.
- See **General Chemistry Section, Page 8**, for Hexavalent Chromium Analysis Prices.

Metals Analysis Packages

Parameter	Matrix
RCRA or Drinking Water Metals	
8 elements: As, Ba, Cd, Cr, Pb, Hg, Se, Ag	Water or Soil
Priority Pollutant Metals (PP Metals)	
13 elements: As, Sb, Be, Cd, Cr, Cu, Ni, Pb, Hg, Se, Ag, Tl, Zn	Water or Soil
Target Analyte List Metals (TAL Metals)	
23 elements: Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn	Water or Soil

300444

General Chemistry

Parameter	Method Water/Soil
Acidity	305.1
Alkalinity	310.1
Carbon Dioxide, Free	406B
Cation Exchange Capacity	9081
Chemical Oxygen Demand	410.4
Chloride	325.3
Chlorine Residual	330.5
Chromium, Hexavalent (Cr+6)	I-1230-84/3060-7196A
Cyanide	335.2
Fluoride	340.2
Hardness	314A
Herbicides	515.1/8150
Nitrogen, Ammonia	350.3
Nitrogen, Nitrate	353.3
Nitrogen, Nitrite	353.3
Oil Grease, Gravimetric	413.1
Oil Grease, IR	413.2
Oxidation Reduction Potential (Water)	ASTM D1498
Oxygen, Dissolved (Winkler)	360.2
Petroleum Hydrocarbons, Total (PHC):	
• Standard turnaround analysis	418.1
• Three to Five work day <i>rush</i> analysis	418.1
• Next day <i>rush</i> analysis	418.1
pH - water samples	150.1
pH - soil samples	9045
Phosphate, Ortho	365.3
Phosphorous, Total	365.3
Phenols, Total	420.1
Residue:	
• Total Dissolved Solids	160.1
• Total Suspended Solids	160.2
• Total Solids	160.3
• Total Volatile Solids	160.4
• Settleable Solids	160.5
• Percent Solids (Moisture) in Soil	3550 Sec. 7.2
Specific Conductance	120.1
Sulfate	375.4
Total Organic Carbon - water	415.1
Total Organic Carbon - soil	9060
Turbidity	180.1

Petroleum Discharge Evaluation Analyses

Parameter	Method Water/Soil
Total Petroleum Hydrocarbons (PHC):	
• Standard turnaround analysis	418.1
• Three to Five work day <i>rush</i> analysis	418.1
• Next day <i>rush</i> analysis	418.1
Priority Pollutant Volatile Organics +15 with Xylenes (VOA+15)	624/8240
Priority Pollutant Volatile Organics +15 with Xylenes, MTBE and TBA	624/8240
Priority Pollutant Volatile Organics +15 with Xylenes and Naphthalenes	624/8240
Priority Pollutant Base/neutral Extractable Organics +15 (BN+15)	625/8270
Priority Pollutant Polynuclear Aromatic Hydrocarbons (PAH)	625/8270
Benzene, Toluene, Ethylbenzene and Xylenes (BTEX)	602/8020
To add MTBE, TBA or DIPE to a BTEX analysis add \$ per compound. To add Naphthalene to a BTEX analysis add \$)	
Lead in Water (Including Digestion Fee)	239.2
Lead In Soil (Including Digestion Fee)	6010
Polychlorinated Biphenyls (PCBs)	608/8080
Hydrocarbon Product Identification (GC-FID):	
1) Qualitative - "GC-Fingerprint"	8015
2) Quantitative -	
• Specify Gasoline Range Organics (GRO)	
• or Diesel Range Organics (DRO)	8015
Extractable Organic Cleanup Procedures:	
• Acid-Base Partition Cleanup	3650
• Alumina Column Cleanup	3611

300446

ENVIROTECH RESEARCH SOP No. M101.1
STANDARD OPERATING PROCEDURE
FOR EXPERIMENTALLY DETERMINED MDLs and
PRECISION and ACCURACY

doc: M101
Revision:

300447

1. INTRODUCTION:

The following procedure is designed to demonstrate and document the laboratory's ability to produce data of acceptable quality and to establish long term procedures for generating data that meets or exceeds method precision, accuracy and detection limit requirements.

2. PRECISION AND ACCURACY:

2.1. Prior to analyzing samples or after modifying the analytical procedure the analyst must make a one-time demonstration to generate acceptable accuracy and precision with each analytical method. This is accomplished by spiking four aliquots of reagent water with a Q.C. check sample concentrate (this concentrate must be prepared independently from the standard solution used to produce the calibration curve for quantitation). The concentration and makeup of the Q.C. check sample is dictated by the method and defined in each analytical SOP. The four Q.C. check samples are processed through the entire analytical scheme and resultant concentrations calculated. The mean concentration (X), percent recovery (P) and standard deviation (S) (in concentration units) are calculated and compared to the method Q.C. acceptance criteria. If X, P, S are within Q.C. limits, sample analysis can begin.

2.2. On an ongoing basis 1 in 20 environmental samples are spiked in duplicate with the Q.C. sample concentrate together with a spiked reagent blank and the percent recovery compared to method percent recovery limits. If any sample parameter percent matrix spike, recovery is outside Q.C. limits the value of the blank spike for that parameter, is checked against the method limits. If the blank spike recovery is within Q.C. limits, the sample spike recovery is considered to be due to sample matrix interference and all data points within that QA batch of samples can be reported. If the blank spike results are outside Q.C. limits, the analytical system is considered "out of control". Sample analysis can not continue until the problem is resolved and an additional blank spike analysis is within Q.C. limits. All samples extracted and analyzed while the analytical system was "out of control" must be reextracted and reanalyzed.

3. METHOD DETECTION LIMIT:

- 3.1. Prior to sample analysis, method detection limits (MDLs) are determined for each analytical procedure used. These MDLs must be confirmed yearly (in the first quarter of each year/preferably in January but no later than March). It is the responsibility of the Supervisor to schedule this work in an identical fashion to scheduled environmental samples. The procedure published in the Code of Federal Regulations, 40 CFR 136, Appendix B, "Definitions and Procedures for the Determination of the Method Detection Limit", July 1, 1990 is to be used to determine each MDL. The following concentrations must be used in determining laboratory generated MDLs.

<u>Analyte</u>	<u>Concentration</u>
Metals (All Techniques)	3 x est. IDL
Purgeable Halocarbons(Method 601)	1 ug/l
Purgeable Halocarbons(Method 8010)	1 ug/kg
Purgeable Aromatics(Method 602)	2 ug/l
Purgeable Aromatics(Method 602)	10.5 ug/
Purgeable Aromatics(Method 8020)	2 ug/kg
Purgeable Aromatics(Method 8020)	0.5 ug/kg
Purgeables(Method 624)	2 ug/l
Purgeables(Method 8240)	5 ug/kg
Pesticides/PCBs(Method 608)	1/5 ug/l
Pesticides/PCBs(Method 8080)	30/150 ug/kg
Base/Neutral Acid Extractables (Method 625)	10 ug/l B/N, 20 ug/l AE
Base/Neutral Acid Extractables (Method 8270)	300 ug/kg B/N, 600 ug/kg AE
Acrolein and Acrylonitrile (Method 603/624)	10/25 ug/l

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<u>Analyte</u>	<u>Concentration</u>
Cyanide (Method 335.3)	5 ug/l
Total Phenolics (Method 420.1)	50 ug/l
Total Petroleum Hydrocarbons (Method 418.1)	1.0 mg/l

At the above listed concentrations seven replicates of spiked reagent water or Na²SO⁴, as appropriate, are processed through the entire analytical scheme. The standard solution used to prepare the seven replicate spike samples must be prepared or purchased from an independent source than that of the quantitation standards as detailed in each analytical SOP. Analyte concentrations and standard deviations S (in concentration units) are calculated and MDLs are determined using the following equation.

$$(S) \times (3.143) = \text{MDL}$$

When following CLP methodologies for organic analyses (OLM03.1), the Contract Required Quantitation Limit (CRQL) is set at the concentration in the sample equivalent to the concentration of the lowest calibration standard analyzed for each analyte. The analysis of this low standard confirms the laboratory's ability to meet the CRQL.

Statistical Quality Control

Internal quality control (QC) samples analyzed in accordance with methods other than CLP are entered into a QA data base. Data maintained in this system includes analytical results from laboratory blanks, spiked blanks, matrix spikes and matrix spike duplicate analyses. This data is used to establish known control limits of accuracy and precision for specific analytical parameters.

The primary function of the QC data base is to produce Shewhart Control Charts which provide accuracy and precision information. Shewhart Charts use QC data from the twenty most recent quality assurance batches for each individual analysis. Separate charts are plotted for each matrix type. Shewhart Charts are produced using parameter and matrix specific data of the following types:

- Blank Spike Percent Recovery
- Matrix Spike Percent Recovery
- Relative Percent Difference of Matrix Spike and Matrix Spike Duplicates

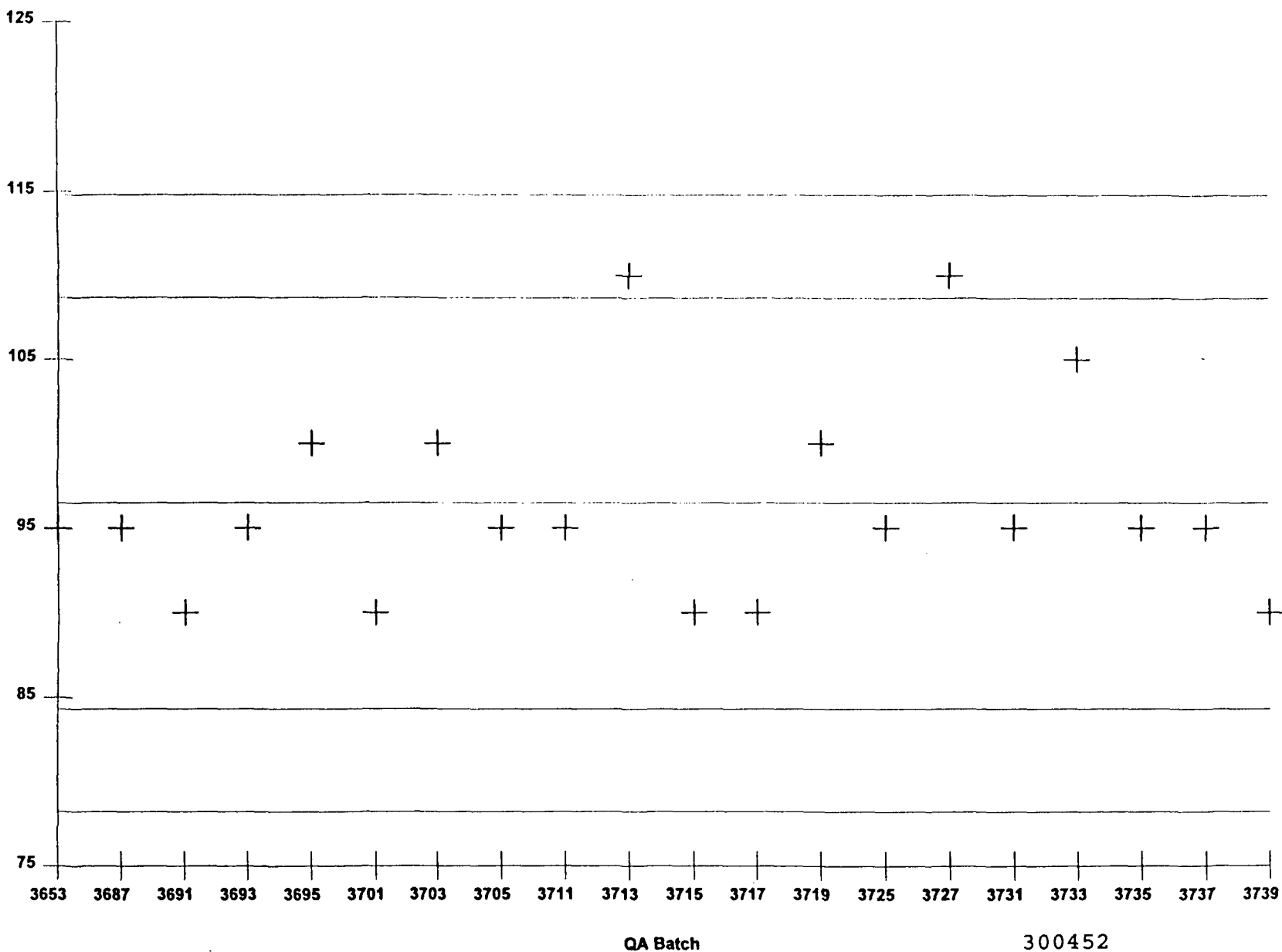
Information presented on these charts include average values, upper control limits, lower control limits, upper warning limits and lower warning limits. The upper and lower control limits are determined and plotted at three standard deviations from the mean. If results fall outside the control limits action is taken to determine the cause of the outlying result. Upper and lower warning limits are determined and plotted at two standard deviations from the mean. Results that fall outside the warning limits are evaluated for any developing trends that may affect data quality.

Several representative Shewhart Charts are presented on the following pages.

BS % Recovery - CHLOROBENZENE - WATER - LOW Level

76

Percent Recovery



Average: 96.50

+2SD: 108.68

+3SD: 114.77

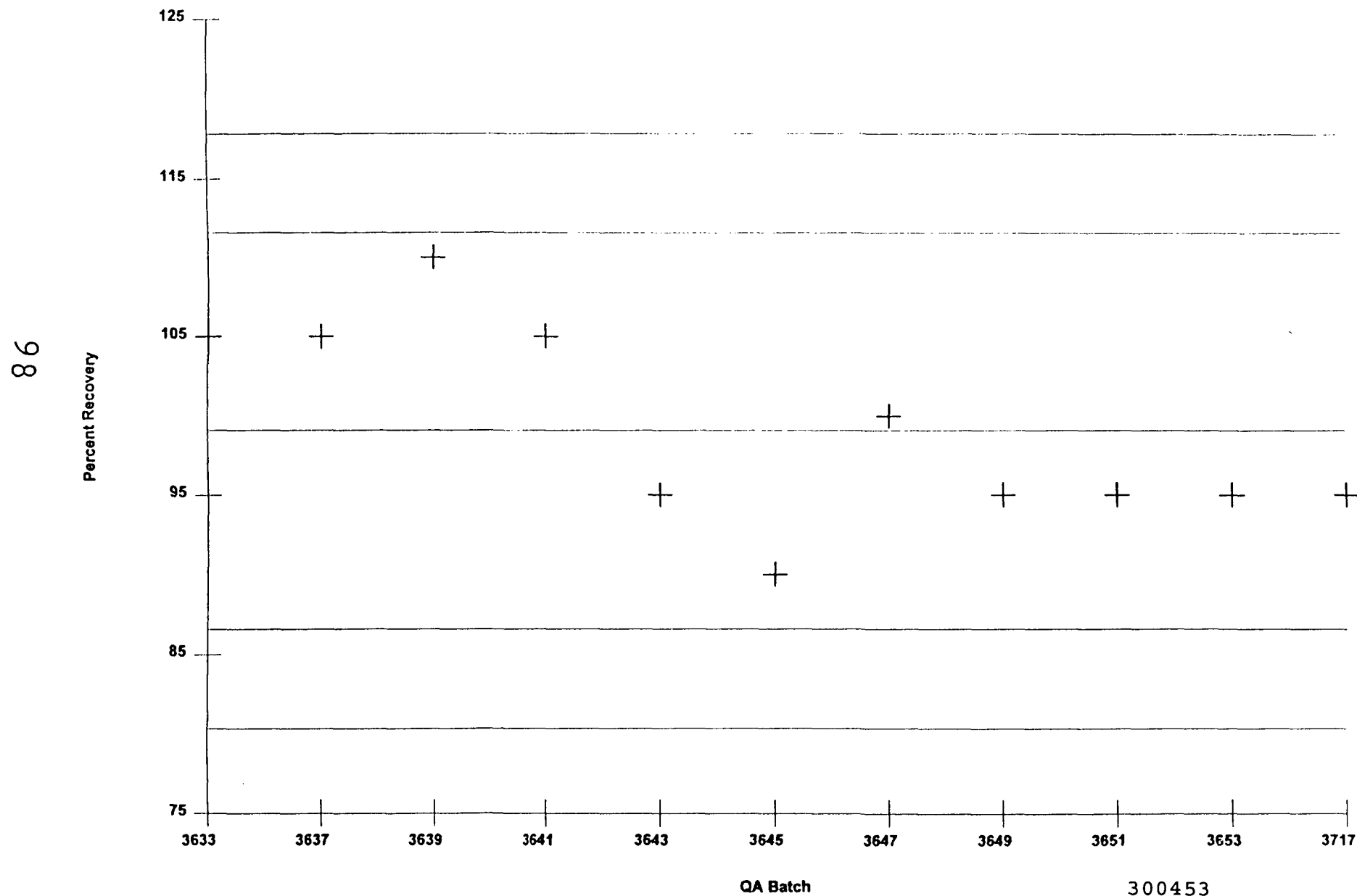
-2SD: 84.32

-3SD: 78.23

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MS % Recovery - CHLOROBENZENE - WATER - LOW Level



Average: 99.09

+2SD: 111.60

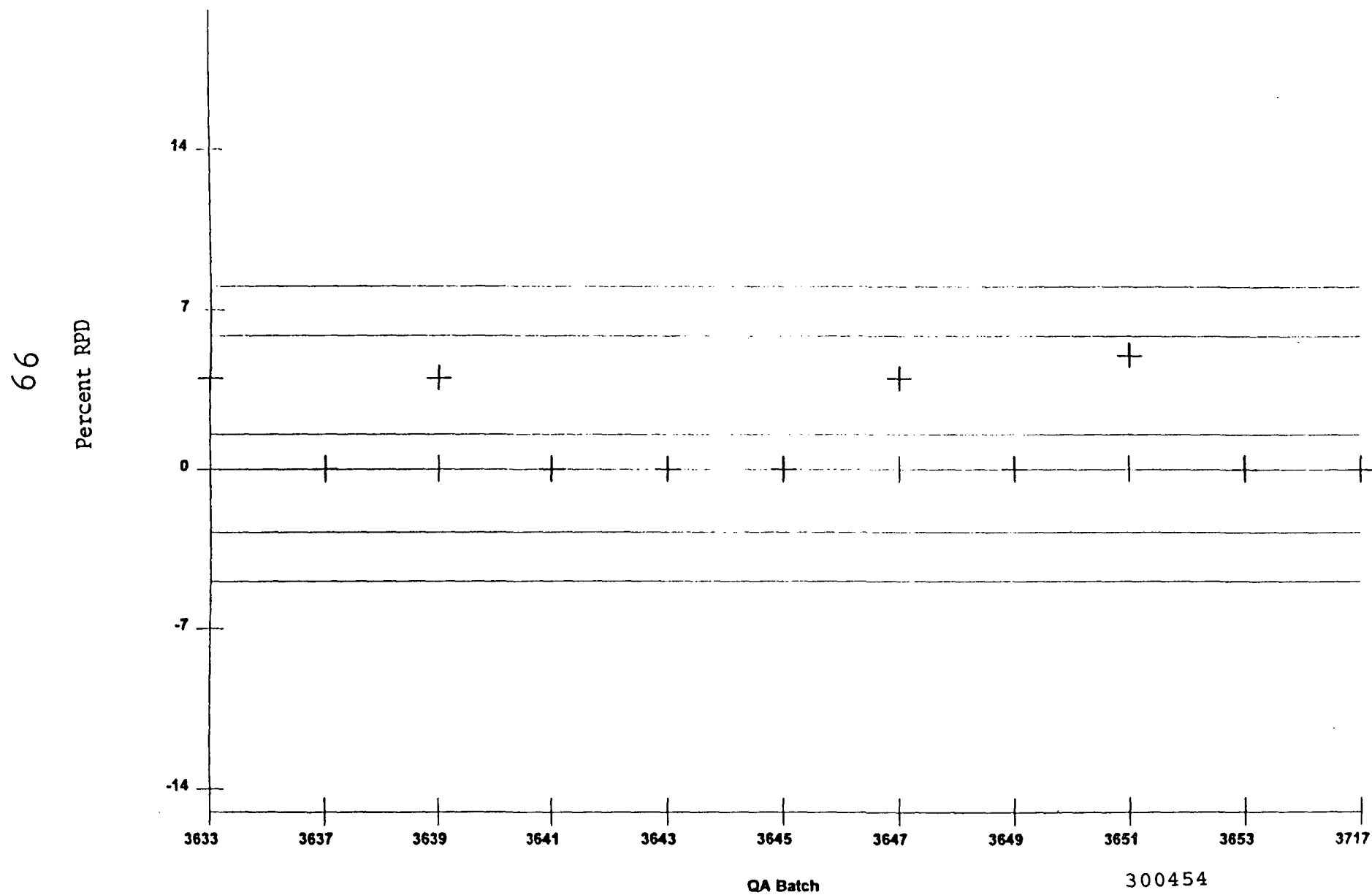
+3SD: 117.85

-2SD: 86.59

-3SD: 80.33

11/2/94

MS/MSD RPD - CHLOROBENZENE - WATER - LOW Level



Average: 1.55

+2SD: 5.87

+3SD: 8.03

-2SD: -2.78

-3SD: -4.94

11/2/94

ENVIROTECH RESEARCH SOP No. D102.1
STANDARD OPERATING PROCEDURE FOR
INTERNAL QA INSPECTION AND CORRECTIVE ACTION PROCEDURES

doc: D102
Revision:

1.0 SCOPE and APPLICATION

1.1 This procedure explains the process of review of Quality Control indicators which are performed in accordance with the methodology being employed.

1.2 The specific criteria which are evaluated are method specific and are enumerated in the respective analytical SOPs. Detailed audit procedures including NJDEPE QA requirements for each method are given in the following QA Checklists:

Attachment	QA Checklist Title
1	Volatile Organics, SW846 Method 8240
2	Semivolatile Organics, SW846 Method 8270
3	Organochlorine Pesticides and PCBs, SW846 Method 8080
4	Metals by ICP, SW846 Method 6010
5	Metals by Graphite Furnace AA, SW846 7000 Series Methods
6	Mercury by Cold Vapor AA, SW846 Method 7471
7	General Chemistry
8	Volatile Organics, USEPA 3/90 SOW
9	Semivolatile Organics, USEPA 3/90 SOW
10	Metals by ICP, USEPA SOW
11	Metals by Graphite Furnace AA, USEPA SOW
12	Mercury by Cold Vapor AA, USEPA SOW

1.3 Corrective action procedures are presented in Section 3 of this SOP as guidance when criteria described in Attachments 1 through 12 are out of acceptance limits.

2.0 PROCEDURE

2.1 The ultimate responsibility for quality inspection rests with the Quality Assurance Officer. The review of Quality Control criteria is performed in a tiered approach. The first level of review is performed by the analyst conducting the test, the next tier of review rests with the department supervisor and the final tier of review is performed by the Quality Assurance Officer.

2.2 Environmental samples are analyzed by different methodologies within a department. The analyst determines which methodology is to be followed before initiating the analysis. Instrument tunes and calibrations are conducted in accordance with the method. If any criteria do not completely satisfy the method requirements for tune and calibration, the analyst stops and rectifies the problem in accordance with the specific analytical SOP. The analyst may seek the assistance of the supervisor.

2.3 The root cause for a nonconformance to method criteria may either be local or systematic. A local nonconformance requires a solution which is isolated to a particular instrument and is readily rectified. A systematic nonconformance is normally present across all instruments in a department. Local nonconformance may be rectified by the analyst alone or by the analyst and the department supervisor. If at any time a systematic nonconformance is suspected, the Quality Assurance Officer is notified and the QAO, department supervisor and one or more analysts initiate a corrective action investigation to isolate and eliminate the root cause of the nonconformance.

2.4 Analysis of samples may occur only after the cause of the nonconformance has been eliminated. The analyst proceeds to acquire data in accordance with the method being followed. After an analytical sequence is complete, each sample is reviewed to determine if it meets the method criteria set forth in the analytical SOP. Specific criteria may vary from method to method and include but are not limited to analytical acquisition occurring within a specified clock, areas of internal standards, surrogate recoveries within acceptable limits, post digestate spike recoveries within limits and absence of contamination in the laboratory blank.

2.5 Particular attention is paid to the Quality Control samples which were run. These samples are subject to the same criteria as typical samples but also give indications of local or systematic nonconformance. An analyst need not notify the department supervisor if the laboratory blank, Matrix Spike, Matrix Spike Duplicate and Blank Spike samples are within method specifications or within the laboratory's control limits as established by the Shewhart Charts. The method being employed determines whether laboratory established or method established criteria are to be used. If any of these samples are outside acceptable limits the department supervisor is notified and reporting of all samples associated with the QC samples is withheld pending a determination as to the cause of the nonconformance.

2.6 Whenever a nonconformance is reported, the supervisor collects all relevant information relating to the analysis in order to follow a logical path to sound judgment. The supervisor first determines if the nonconformance is local or systematic. If a systematic nonconformance is suspected, the Quality Assurance Officer is notified and a corrective action investigation is initiated. Typically, samples will be re-extracted and rerun if sufficient sample exists to confirm local nonconformance. The Quality Assurance Officer has the final authority and say if there is a disagreement.

2.7 The correction of a local nonconformance is documented in the analytical run logbook.

2.8 All instances of nonconformance are explained on the jobs Non-Conformance Summary which is kept in the job specific folder in the Data Management Office.

2.9 Periodically, random, unannounced comprehensive QA audits are conducted by the Quality Assurance Officer.

3.0 CORRECTIVE ACTIONS

3.1 Corrective Actions are taken based upon QA Checklists presented in Attachments 1 through 12. The type of action that may be taken is based upon an overall assessment of factors relating to a particular testing program and when a problem is discovered i.e. is the sample still within its holding time).

3.2 The corrective action most frequently required when a question in Attachments 1 through 12 is answered "no" is to reject the results and re-analyzed the samples. This assumes that the specific problems noted in the QA Checklist is discovered when the sample is within holding time. Accordingly the first round of QA review is performed by the analyst conducting the test and resolved with their supervisor.

3.3 Corrective action taken if it is discovered that a sample exceeds holding time includes contacting the client to determine if new samples that are within holding time are available. If new samples are available perform analysis within holding time, if not note holding time nonconformance in the case narrative or nonconformance summary.

Attachment 1

QA Checklist - Volatile Organics, SW846 Method 8240

Yes No

— —

1. For soil or water samples preserved with Hcl upon sample collection, was analysis conducted within 14 days of sample collection and was the pH of the water samples recorded in the sun log?

For un-preserved water samples, was analysis conducted within 7 days of sample collection?

— —

2. Did every analytical sequence commence run at standard injection of 50 ng of BFB that met the method specified criteria?

— —

3. Was a 5 point initial calibration run at standard concentrations of 10, 20, 50, 100 and 200 ppb and did this calibration range meet the method specified criteria for Minimum RF and Maximum %RSD and were Surrogate Compounds added to the standards at these concentrations?

— —

4. If a continuing calibration check standard was run, was it run at the midpoint of the initial calibration range, did it meet the method specified criteria for Minimum RF and Maximum %D and were all subsequent samples quantitated using the RFs generated by the continuing calibration check?

— —

5. Did the method blank contain less than the MDL for all target compounds, except for the Methylene Chloride, 2-Butanone and Acetone, which must be less than or equal to 3 times the MDL?

— —

6. Were the standard or standards run immediately after the BFB?

— —

7. Was the method blank run immediately after the standard or standards?

— —

8. Were all subsequent samples injected within 12 hours of the BFB injection time?

— —

9. Were the following Internal Standards used at the following concentrations in all standards, samples, blanks and QA samples?

- | | |
|------------------------|----------|
| 1. Bromochloromethane | - 50 ppb |
| 2. 1,4-Difluorobenzene | - 50 ppb |
| 3. Chlorobenzene - d5 | - 50 ppb |

Attachment 1

QA Checklist - Volatile Organics, SW846 Method 8240

Yes No

— —

10. Were the compounds quantitated against the method specified internal standard?

— —

11. Were the Internal Standard areas within -50% to +100% of the Internal Standard area of the calibration standard?

— —

12. Were the following Surrogate Compounds added to all samples, blanks and QA samples at the following concentrations?

- 1. 1,2-Dichloroethane-d4 - 50 ppb
- 2. Toluene-d8 - 50 ppb
- 3. Bromofluorobenzene - 50 ppb

— —

13. Were the surrogate recoveries within laboratory control limits?

— —

14. If either the Internal Standard areas or Surrogate Compound recoveries were outside acceptable limits, was the sample re-analyzed to confirm the matrix interferences?

— —

15. Was at least one Matrix Spike/Matrix Spike Duplicate pair run per 20 environmental samples per matrix and were the following compound spiked at the following concentrations?

- 1. 1,1-Dichloroethene - 50 ppb
- 2. Trichloroethene - 50 ppb
- 3. Benzene - 50 ppb
- 4. Toluene - 50 ppb
- 5. Chlorobenzene - 50 ppb

— —

16. Were all environmental samples analyzed within 28 days of their related MS/MSD?

— —

17. Are the chromatograms adequately resolved, not overloaded and free of carryover?

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Attachment 1

QA Checklist - Volatile Organics, SW846 Method 8240

Yes No

— —

18. Were RT and/or mass spectral identification criteria met?

— —

19. Were all detected analytes within the linear range of the instrument?

— —

20. Have all calculations involving dilutions been spot checked?

— —

21. Was the purge heated to 40°C for low level soil analyses?

300461

Attachment 2

QA Checklist - Semivolatile Organics, SW846 Method 8270

Yes No

- | | | |
|----------|----------|--|
| <u>—</u> | <u>—</u> | 1. Were soil samples extracted within 14 days of sample collection and was analysis performed within 40 days of sample extraction?
Were water samples extracted within 7 days of sample collection and was analysis performed within 40 days of sample extraction? |
| <u>—</u> | <u>—</u> | 2. Did every analytical sequence commence with an injection of 50 ng of DFTPP that met the method specified criteria? |
| <u>—</u> | <u>—</u> | 3. Was a 5 point initial calibration run at standard concentrations of 10, 20, 50, 80 and 120 ppm and did this calibration range meet the method specified criteria for Minimum RF and Maximum %RSD and were Surrogate Compounds added to the standards at these concentrations? |
| <u>—</u> | <u>—</u> | 4. If a continuing calibration check standard was run, was it run at the midpoint of the initial calibration range and did it meet the method specified criteria for Minimum RF and Maximum %D? |
| <u>—</u> | <u>—</u> | 5. Did the method blank contain less than the MDL for all target compounds, except for the phthalate esters, which must be less than or equal to 3 times the MDL? |
| <u>—</u> | <u>—</u> | 6. Were the standard or standards run immediately after the DFTPP? |
| <u>—</u> | <u>—</u> | 7. Were all subsequent samples injected within 12 hours of the DFTPP injection time? |
| <u>—</u> | <u>—</u> | 8. Were the following Internal Standards used at the following concentrations in all standards, samples, blanks and QA samples? |

- | | |
|---------------------------|---------|
| 1. 1,4-Dichlorobenzene-d4 | -40 ppm |
| 2. Naphthalene-d8 | -40 ppm |
| 3. Chysene-d12 | -40 ppm |
| 4. Acenaphthene-d10 | -40 ppm |
| 5. Phenanthrene-d10 | -40 ppm |
| 6. Perylene-d12 | -40 ppm |

Attachment 2

QA Checklist - Semivolatile Organics, SW846 Method 8270

Yes No

— —

9. Were the compounds quantitated against the method specified internal standard?

— —

10. Were the Internal Standard areas within - 50% to +100% of the Internal Standard area of the calibration standard?

— —

11. Were the following Surrogate Compounds added to all low level samples, blanks and QA samples at the following concentrations?

- | | |
|-------------------------|---------------------|
| 1. 2-Fluorophenol | - 800 ppm x 0.25 ml |
| 2. Phenol-d5 | -800 ppm x 0.25 ml |
| 3. 2,4,6-Tribromophenol | -800 ppm x 0.25 ml |
| 4. Nitrobenzene-d5 | -400 ppm x 0.25 ml |
| 5. 2-Fluorobephenyl | -400 ppm x 0.25 ml |
| 6. Terphenyl-d14 | -400 ppm x 0.25 ml |

— —

12. Were the following Surrogate Compounds added to all high level samples, blanks and QA samples at the following concentrations?

- | | |
|-------------------------|---------------------|
| 1. 2-Fluorophenol | - 800 ppm x 0.50 ml |
| 2. Phenol-d5 | -800 ppm x 0.50 ml |
| 3. 2,4,6-Tribromophenol | -800 ppm x 0.50 ml |
| 4. Nitrobenzene-d5 | -400 ppm x 0.50 ml |
| 5. 2-Fluorobephenyl | -400 ppm x 0.50 ml |
| 6. Terphenyl-d14 | -400 ppm x 0.50 ml |

— —

13. If either the Internal Standard areas or Surrogate Compound recoveries outside acceptable limits, was the sample re-analyzed to confirm the matrix interference?

— —

14. Was at least one Matrix Spike/Matrix Spike Duplicate pair run per 20 low level environmental samples per matrix and were the following compound spiked at the following concentrations?

- | | |
|------------------------|---------------------|
| 1. Phenol | - 800 ppm x 0.25 ml |
| 2. 2-Chlorophenol | - 800 ppm x 0.25 ml |
| 3. 1,4-Dichlorobenzene | - 400 ppm x 0.25 ml |

Attachment 2

QA Checklist - Semivolatile Organics, SW846 Method 8270

Yes No

- | | |
|-------------------------------|---------------------|
| 4. N-Nitroso-di-n-propylamine | - 400 ppm x 0.25 ml |
| 5. 1,2,4-Trichlorobenzene | - 400 ppm x 0.25 ml |
| 6. 4-Chloro-3-methylphenol | - 800 ppm x 0.25 ml |
| 7. Acenaphthene | - 400 ppm x 0.25 ml |
| 8. 4-Nitrophenol | - 800 ppm x 0.25 ml |
| 9. 2,4-Dinitrotoluene | - 400 ppm x 0.25 ml |
| 10. Pentachlorophenol | - 800 ppm x 0.25 ml |
| 11. Pyrene | - 400 ppm x 0.25 ml |

— — 14. Was at least one Matrix Spike/Matrix Spike Duplicate pair run per 20 high level environmental samples per matrix and were the following compound spiked at the following concentrations?

- | | |
|-------------------------------|--------------------|
| 1. Phenol | - 800 ppm x 0.5 ml |
| 2. 2-Chlorophenol | - 800 ppm x 0.5 ml |
| 3. 1,4-Dichlorobenzene | - 400 ppm x 0.5 ml |
| 4. N-Nitroso-di-n-propylamine | - 400 ppm x 0.5 ml |
| 5. 1,2,4-Trichlorobenzene | - 400 ppm x 0.5 ml |
| 6. 4-Chloro-3-methylphenol | - 800 ppm x 0.5 ml |
| 7. Acenaphthene | - 400 ppm x 0.5 ml |
| 8. 4-Nitrophenol | - 800 ppm x 0.5 ml |
| 9. 2,4-Dinitrotoluene | - 400 ppm x 0.5 ml |
| 10. Pentachlorophenol | - 800 ppm x 0.5 ml |
| 11. Pyrene | - 400 ppm x 0.5 ml |

— — 15 Were all environmental samples prepared within 28 days of their related MS/MSD?

— — 16. Are the chromatograms adequately resolved, not overload and free of carryover?

— — 17. Were RT and /or mass spectral identification criteria met?

— — 18. Were all detected analytes within the linear range of the instrument?

— — 19. Have all calculations involving dilutions been spot checked?

300464

Attachment 3

QA Checklist - Organochlorine Pesticides and PCBs
SW846 Method 8080

Yes No

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 1. Were soil samples extracted within 14 days of sample collection and was analysis performed within 40 days of sample extraction?
Were water samples extracted within 7 days of sample collection and was analysis performed within 40 days of sample extraction? |
| <input type="checkbox"/> | <input type="checkbox"/> | 2. Were standards, QA samples and samples run on two dissimilar columns? |
| <input type="checkbox"/> | <input type="checkbox"/> | 3. For Pesticide Analysis, was a 5 point initial calibration run on both columns for single components and did this calibration range meet the method specified criteria for Maximum %RSD and were Surrogate Compounds added to the standards? |
| <input type="checkbox"/> | <input type="checkbox"/> | 4. For PCB Analysis, was a 5 point initial calibration run on both columns for Arochlor-1016 and Arochlor-1260 and did this calibration range meet the method specified criteria for Maximum % RSD? |
| <input type="checkbox"/> | <input type="checkbox"/> | 5. If a 5 point calibration was not run within the analytical clock for the single components or 1016 and 1260, was a successful check standard run against a 5 point range for these analytes? |
| <input type="checkbox"/> | <input type="checkbox"/> | 6. Was a single point run for all other target analytes within the analytical clock for the purpose of identification? |
| <input type="checkbox"/> | <input type="checkbox"/> | 7. If an analyte other than a single component Pesticide, Arochlor-1016 or Arochlor 1260 was identified in a sample, was a successful 5 point initial calibration run for the analyte or was a successful check standard run against a 5 point calibration for that analyte within the analytical clock? |
| <input type="checkbox"/> | <input type="checkbox"/> | 8. For Pesticide Analysis, was an Endrin/DDT standard run on both columns prior to analysis and did was the breakdown within method specified limits? |
| <input type="checkbox"/> | <input type="checkbox"/> | 9. If an interference was present in the analysis, was the appropriate extract cleanup procedure used? |

300465

Attachment 3

QA Checklist - ORGANOCHLORINE Pesticides and PCBs
SW846 Method 8080

Yes No

— —

10. Did the method blank contain less than the MDL for all target compounds?

— —

11. Were the following Surrogate Compounds added to all samples, blanks and QA samples at the following concentrations for Pesticide Analysis?

1. Tetrachloro-m-xylene - 10 ppm x 0.05 ml
2. Dibutylchlorendate - 10 ppm x 0.05 ml
3. Decachlorobiphenyl - 10 ppm x 0.05 ml

— —

12. Were the following Surrogate Compounds added to all samples, blanks and QA samples at the following concentrations for PCB Analysis?

1. Tetrachloro-m-xylene - 10 ppm x 0.05 ml
2. Dibutylchlorendate - 10 ppm x 0.05 ml
3. Decachlorobiphenyl - 10 ppm x 0.05 ml

— —

13. Were the surrogate recoveries within laboratory control limits?

— —

14. Was at least one Matrix Spike/Matrix Spike Duplicate pair run for Pesticide Analysis per 20 environmental samples per matrix and were the following compound spiked at the following concentrations?

1. Lindane - 20 ppm x 0.1 ml
2. Heptachlor - 20 ppm x 0.1 ml
3. Aldrin - 20 ppm x 0.1 ml
4. Dieldrin - 20 ppm x 0.1 ml
5. Endrin - 20 ppm x 0.1 ml
6. 4,4'-DDT - 20 ppm x 0.1 ml

— —

15. Was at least one Matrix Spike/Matrix Spike Duplicate pair run for PCB Analysis per 20 environmental samples per matrix and were the following compound spiked at the following concentrations?

1. Arochlor-1016 - 100 ppm x 0.05 ml
2. Arochlor-1260 - 100 ppm x 0.05 ml

Attachment 3

QA Checklist - Organochlorine Pesticides and PCBs
SW846 Method 8080

Yes No

- | | | |
|----------|----------|---|
| <u>—</u> | <u>—</u> | 16. Were all environmental samples prepared within 28 days of their related MS/MSD? |
| <u>—</u> | <u>—</u> | 17. Are the chromatograms adequately resolved, not overloaded and free of carryover? |
| <u>—</u> | <u>—</u> | 18. Were RT identification criteria met on both the primary and confirmation columns? |
| <u>—</u> | <u>—</u> | 19. Were all detected analytes within the linear range of the instrument? |
| <u>—</u> | <u>—</u> | 20. Have all calculations involving dilutions been spot checked? |

Attachment 4

QA CHECKLIST - Metals by ICP, SW846 Method 6010

Yes No

- | | | |
|-------------|-------------|--|
| <u> </u> | <u> </u> | 1. Were all samples digested and analyzed within 180 days of sample collection? |
| <u> </u> | <u> </u> | 2. Were QC samples (e.g. Laboratory Control Sample, Prep Blank, Spike Sample, Spike Sample Duplicate and Sample Duplicate) digested with each batch of 20 environmental samples? |
| <u> </u> | <u> </u> | 3. Was the instrument calibrated with a minimum of 3 standards? |
| <u> </u> | <u> </u> | 4. Was an Initial Calibration Verification run prior to sample analysis run? |
| <u> </u> | <u> </u> | 5. Was an Initial Calibration Blank run after each Initial Calibration Verification? |
| <u> </u> | <u> </u> | 6. Was the high standard analyzed at the beginning of the sample analysis run and were the results $\pm 5\%$ of the true value? |
| <u> </u> | <u> </u> | 7. Were Interference Check Samples (ICSA and ICSAB) run at the beginning and end of sample analysis run? |
| <u> </u> | <u> </u> | 8. Was a Continuing Calibration Verification run after a maximum of 10 samples? |
| <u> </u> | <u> </u> | 9. Was a Continuing Calibration Blank run after each Continuing Calibration Verification? |
| <u> </u> | <u> </u> | 10. Did the Initial Calibration Verification/Continuing Calibration Verification meet the 10% control limit? |
| <u> </u> | <u> </u> | 11. absolute value of the Initial Calibration Blank/Continuing Calibration Blank less than the MDL? |
| <u> </u> | <u> </u> | 12. Were the results of the ICSAB within 20% of the true value? |
| <u> </u> | <u> </u> | 13. Was each sample within the calibration range? |

300468

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Attachment 4

QA CHECKLIST - Metals by ICP, SW846 Method 6010

Yes No

— —

14. Did the Prep Blank meet criteria i.e. were the results less than the absolute value the MDL?

— —

15. If the Prep Blank did not meet criteria , was the entire prep batch re-digested and reanalyzed?

— —

16. Were MS/MSD recoveries within 75-125% limit?

— —

17. Was MS/MSD RPD less than 20%?

— —

18. Was a Post Analysis Spike run to demonstrate the absence of interference?

— —

19. Was the Laboratory Control Sample within QC Limits?

— —

20. Was Sample/Duplicate RPD less than 20%?

— —

21. Was a Serial Dilution run for each batch of samples to show the absence of interferences?

— —

22. Were the results of the Serial Dilution within 10% of the original determination?

300469

Attachment 5

**QA CHECKLIST - Metals by Graphite Furnace AA,
SW846 7000 Series Methods**

GRAPHITE FURNACE:

Yes No

- | | | |
|-------------|-------------|--|
| <u> </u> | <u> </u> | 1. Were all samples digested and analyzed within 180 days of sample collection? |
| <u> </u> | <u> </u> | 2. Were QC Samples (e.g. Laboratory Control Sample, Prep Blank, Spike Sample, Spike Sample Duplicate and Sample Duplicate) digested with each batch of 20 environmental samples? |
| <u> </u> | <u> </u> | 3. Were calibration standards and calibration check standards prepared daily? |
| <u> </u> | <u> </u> | 4. Was the instrument calibrated with a minimum of 5 standards? |
| <u> </u> | <u> </u> | 5. Was each calibration standard injected in triplicate? |
| <u> </u> | <u> </u> | 6. Was an Initial Calibration Verification run prior to sample analysis run? |
| <u> </u> | <u> </u> | 7. Was an Initial Calibration Blank run after each Initial Calibration Verification? |
| <u> </u> | <u> </u> | 8. Was a Continuing Calibration Verification run after each 20 sample injections? |
| <u> </u> | <u> </u> | 9. Was a Continuing Calibration Blank run after each Continuing Calibration Verification? |
| <u> </u> | <u> </u> | 10. Did the Initial Calibration Verification/Continuing Calibration Verification meet the 10% control limit? |
| <u> </u> | <u> </u> | 11. Was the absolute value of the Initial Calibration Blank/Continuing Calibration Blank less than the MDL? |
| <u> </u> | <u> </u> | 12. Was each sample digestate injected in duplicate? |
| <u> </u> | <u> </u> | 13. Was the duplicate injection less than 20% RPD? |
| <u> </u> | <u> </u> | 14. Was each sample within the calibration range? |

300470

ENVIROTECH RESEARCH, INC.

Attachment 5

QA CHECKLIST - Metals by Graphite Furnace AA, SW846 7000 Series Methods

GRAPHITE FURNACE:

Yes No

- | | | |
|-------------|-------------|---|
| <u> </u> | <u> </u> | 15. Was each sample post spiked ? |
| <u> </u> | <u> </u> | 16. Was the post spike recovery within 85-115? |
| <u> </u> | <u> </u> | 17. If the post spike recovery was not within acceptable limits, was the sample run by Method of Standard Addition? |
| <u> </u> | <u> </u> | 18. Were Method of Standard Addition requirements met? |
| <u> </u> | <u> </u> | 19. Did the Prep Blank meet criteria i.e. were results less than the absolute value of the MDL? |
| <u> </u> | <u> </u> | 20. If the Prep Blank did not meet criteria, was the entire prep batch re-digested and re-analyzed? |
| <u> </u> | <u> </u> | 21. Were MS/MSD recoveries within 75-125% limit? |
| <u> </u> | <u> </u> | 22. Was MS/MSD RPD less than 20%? |
| <u> </u> | <u> </u> | 23. Was Sample/Duplicate RPD less than 20%? |
| <u> </u> | <u> </u> | 24. Was the Laboratory Control Sample within QC limits? |

300471

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Attachment 6

QA CHECKLIST - Mercury by Cold Vapor AA, SW846 Method 7471

COLD VAPOR:

Yes No

- | | | |
|----------|----------|--|
| <u>—</u> | <u>—</u> | 1. Were all samples digested and analyzed within 28 days of sample collection? |
| <u>—</u> | <u>—</u> | 2. Were QC Samples (e.g. Laboratory Control Sample, Prep Blank, Spike Sample, Spike Sample Duplicate and Sample Duplicate) digested with each batch of 20 environmental samples? |
| <u>—</u> | <u>—</u> | 3. Was the instrument calibrated with a minimum of 4 standards? |
| <u>—</u> | <u>—</u> | 4. Was an Initial Calibration Verification run prior to sample analysis run? |
| <u>—</u> | <u>—</u> | 5. Was an Initial Calibration Blank run after each Initial Calibration Verification? |
| <u>—</u> | <u>—</u> | 6. Was a Continuing Calibration Verification run after a maximum of 15 samples? |
| <u>—</u> | <u>—</u> | 7. Was a Continuing Calibration Blank run after each Continuing Calibration Verification? |
| <u>—</u> | <u>—</u> | 8. Did the Initial Calibration Verification/Continuing Calibration Verification meet the 20% control limit? |
| <u>—</u> | <u>—</u> | 9. Was the absolute value of the Initial Calibration/Continuing Calibration Blank less than the MDL? |
| <u>—</u> | <u>—</u> | 10. Was each sample within the calibration range? |
| <u>—</u> | <u>—</u> | 11. Did the Prep Blank meet criteria i.e. were the results less than the absolute value of the MDL? |

300472

ENVIROTECH RESEARCH, INC.

Attachment 6

QA CHECKLIST - Mercury by Cold Vapor AA, SW846 Method 7471

COLD VAPOR:

Yes No

- | | | |
|----------|----------|---|
| <u>—</u> | <u>—</u> | 12. If the Prep Blank did not meet criteria, was the entire prep batch re-digested and re-analyzed? |
| <u>—</u> | <u>—</u> | 13. Were MS/MSD recoveries within 75-125% limit? |
| <u>—</u> | <u>—</u> | 14. Was MS/MSD RPD less than 20%? |
| <u>—</u> | <u>—</u> | 15. Was Sample/Duplicate RPD less than 20%? |
| <u>—</u> | <u>—</u> | 16. Was the Laboratory Control Sample within QC litmus? |

300473

Attachment 7

QA CHECKLIST - GENERAL CHEMISTRY

Yes No

- | | | |
|----------|----------|---|
| <u>—</u> | <u>—</u> | 1. Were all samples extracted and analyzed within the appropriate holding times? |
| <u>—</u> | <u>—</u> | 2. Were acceptable calibration standards run? |
| <u>—</u> | <u>—</u> | 3. Did the method blank contain less than the MDL of the target analyte? |
| <u>—</u> | <u>—</u> | 4. If applicable, was an MS/MSD or MS/DUP analyzed and was the recovery within laboratory limits? |
| <u>—</u> | <u>—</u> | 5. If applicable, were all environmental samples prepared within 28 days of their related MS/MSD or MS/DUP? |
| <u>—</u> | <u>—</u> | 6. Were all analyte concentrations within the linear range of the instrument being used? |
| <u>—</u> | <u>—</u> | 7. Have all calculations involving dilutions been spot checked? |

Attachment 8

QA CHECKLIST - Volatile Organics, USEPA SOW

Yes No

— —

1. For soil or water samples preserved with Hcl upon sample collection, was analysis conducted within 10 days of verified sample receipt and was the pH of the water samples recorded in the run log?

— —

2. Did every analytical sequence commence with an injection of 50 ng of BFB that met the method specified criteria?

— —

3. Was a 5 point initial calibration run at standard concentrations of 10, 20, 50, 100 and 200 ppb and did this calibration range meet the method specified criteria for Minimum RF and Maximum %RSD and were System Monitoring Compounds added to the standards at these concentrations?

— —

4. If a continuing calibration check standard was run, was it run at the midpoint of the initial calibration range, did it meet the method specified criteria for Minimum RF and Maximum %D and were all subsequent samples quantitated using the RFs generated by the continuing calibration check?

— —

5. Did the method blank contain less than the CRQL for all target compounds, except for the Methylene Chloride, 2-Butanone and Acetone, which must be less than or equal to 5 times the CRQL. If the analysis is being done for the NJ Laboratory Services contract, Methylene Chloride, 2-Butanone and Acetone must be less than or equal to 3 times the CRQL.?

— —

6. Were the standard or standards run immediately after the BFB?

— —

7. Was the method blank run immediately after the standard or standards and if the analysis was being conducted for the NJ Lab Services contract, was an aqueous blank used?

— —

8. Were all subsequent samples injected within 12 hours of the BFB injection time?

— —

9. Were the following Internal Standards used at the following concentrations all standards, samples, blanks and QA samples?

- | | |
|------------------------|--------|
| 1. Bromochloromethane | 50 ppb |
| 2. 1,4-Difluorobenzene | 50 ppb |
| 3. Chlorobenzene - d5 | 50 ppb |

300475

Attachment 8

QA CHECKLIST - CLP 3/90 - VOAs

Yes No

— — 10. Were compounds quantitated against the method specified internal standard?

— — 11. Were the Internal Standard areas within -50% to +100% of the Internal Standard area of the calibration standard?

— — 12. Were the following System Monitoring Compounds added to all samples, blanks and QA samples at the following concentrations?

- 1. 1,2-Dichloroethane-d4 - 50 ppb
- 2. Toluene-d8 - 50 ppb
- 3. Bromofluorobenzene - 50 ppb

— — 13. Were the System Monitoring Compound within contract required limits?

— — 14. If either the Internal Standard areas or System Monitoring Compound recoveries outside acceptable limits, was the sample re-analyzed to confirm the matrix interference?

— — 15. Was at least one Matrix Spike/Matrix Spike Duplicate pair run per 20 environmental samples per matrix and were the following compound spiked at the following concentrations?

- 1. 1,1-Dichloroethene - 50 ppb
- 2. Trichloroethene - 50 ppb
- 3. Benzene - 50 ppb
- 4. Toluene - 50 ppb
- 5. Chlorobenzene - 50 ppb

— — 16. Were all environmental samples analyzed within 14 days of their related MS/MSD?

— — 17. Are the chromatograms adequately resolved, not overloaded and free of carryover?

— — 18. Were RT and/or mass spectral identification criteria met?

Attachment 8

QA CHECKLIST - CLP 3/90 - VOAs

Yes No

— —

19. Were all detected analytes within the linear range of the instrument?

— —

20. Have all calculations involving dilutions been spot checked?

— —

21. Was the purge heated to 40°C for low level soil analyses?

300477

Attachment 9

QA CHECKLIST - Semivolatile Organics, USEPA SOW

Yes No

- | | | |
|----------|----------|---|
| <u>—</u> | <u>—</u> | 1. Were soil samples extracted within 10 days of verified sample receipt and was analysis performed within 40 days of sample extraction?
Were water samples extracted within 10 days of verified sample receipt and was analysis performed within 40 days of sample extraction? |
| <u>—</u> | <u>—</u> | 2. Did every analytical sequence commence with an injection of 50 ng of DFTPP that met the method specified criteria? |
| <u>—</u> | <u>—</u> | 3. Was a 5 point initial calibration run at standard concentrations of 10, 25, 40, 60 and 80 ppm and did this calibration range meet the method specified criteria for Minimum RF and Maximum %RSD and were Surrogate Compounds added to the standards at these concentrations? |
| <u>—</u> | <u>—</u> | 4. If a continuing calibration check standard was run, was it run at the 25 ppm concentration and did it meet the method specified criteria for Minimum RF and Maximum %D? |
| <u>—</u> | <u>—</u> | 5. Did the method blank contain less than or equal to the CRQL of every target compound except the phthalate esters, which must be less than or equal to 5 times the CRQL? If the analysis is being done for the NJ Laboratory Services contract, the phthalate esters must be less than or equal to 3 times the CRQL. |
| <u>—</u> | <u>—</u> | 6. Were 2 ul injected for all the standards, QA samples and environmental samples? |
| <u>—</u> | <u>—</u> | 7. Were the standard or standards run immediately after the DFTPP? |
| <u>—</u> | <u>—</u> | 8. Were all subsequent samples injected within 12 hours of the DFTPP injection time? |
| <u>—</u> | <u>—</u> | 9. Were the following Internal Standards used at the following concentrations in all standards, samples, blanks and QA samples?
1. 1,4-Dichlorobenzene-d4 - 20 ppm
2. Naphthalene-d8 - 20 ppm
3. Chrysene-d12 - 20 ppm
4. Acenaphthene-d10 - 20 ppm
5. Phenanthrene-d10 - 20 ppm
6. Perylene-d12 - 20 ppm |

300478

Attachment 9

QA CHECKLIST - Semivolatile Organics, USEPA SOW

Yes No

- | | | |
|---|---|--|
| — | — | 10. Were the compounds quantitated against the method specified internal standard? |
| — | — | 11. Were the Internal Standard areas within -50% to +100% of the Internal Standard area of the calibration standard? |
| — | — | 12. Were the following Surrogate Compounds added to all samples, blanks and QA samples at the following concentrations? |
| | | 1) 2-Fluorophenol -150 ppm x 0.5 ml |
| | | 2) Phenol-d5 -150 ppm x 0.5 ml |
| | | 3) 2-Chlorophenol-d4 -150 ppm x 0.5 ml |
| | | 4) Nitrobenzene-d5 -100 ppm x 0.5 ml |
| | | 5) 2-Fluorobiphenyl -100 ppm x 0.5 ml |
| | | 6) 1,2-Dichlorobenzene-d4 -100 ppm x 0.5 ml |
| | | 7) Terphenyl-d14 -100 ppm x 0.5 ml |
| | | 8) 2,4,6-Tribromophenol -150 ppm x 0.5 ml |
| — | — | 13. Were the surrogate recoveries within contract required control litmus? |
| — | — | 14. If either the Internal Standard areas or Surrogate Compound recoveries outside acceptable limits, was the sample re-analyzed to confirm the matrix interference? |

Attachment 9

QA CHECKLIST - Semivolatile Organics, USEPA SOW

Yes No

— —

15. Was at least one Matrix Spike/Matrix Spike Duplicate pair run per 20 environmental samples per matrix and were the following compound spiked at the following concentrations?

Phenol	- 150 ppm x 0.5 ml
2-Chlorophenol	- 150 ppm x 0.5 ml
1,4-Dichlorobenzene	- 100 ppm x 0.5 ml
N-Nitroso-di-n-propylamine	- 100 ppm x 0.5 ml
1,2,4-Trichlorobenzene	- 100 ppm x 0.5 ml
4-Chloro-3-methylphenol	- 150 ppm x 0.5 ml
Acenaphthene	- 100 ppm x 0.5 ml
4-Nitrophenol	- 150 ppm x 0.5 ml
2,4-Dinitrotoluene	- 100 ppm x 0.5 ml
Pentachlorophenol	- 150 ppm x 0.5 ml
Pyrene	- 100 ppm x 0.5 ml

— —

16. Were all environmental samples prepared within 14 days of their related MS/MSD?

— —

17. Are the chromatograms adequately resolved, not overloaded and free of carryover?

— —

18. Were RT and/or mass spectral identification criteria met?]

— —

19. Were all detected analytes within the linear range of the instrument?

— —

20. Have all calculations involving dilutions been spot checked?

ENVIROTECH RESEARCH, INC.

Attachment 10

QA CHECKLIST - Metals by ICP, USEPA SOW

ICP:

Yes No

- | | | |
|----------|----------|--|
| <u>—</u> | <u>—</u> | 1. Were all samples digested and analyzed within 180 days of sample collection? |
| <u>—</u> | <u>—</u> | 2. Were QC samples (e.g. Laboratory Control Sample, Prep Blank, Spike Sample and Sample Duplicate) digested with each batch of 20 environmental samples? |
| <u>—</u> | <u>—</u> | 3. Was the instrument calibrated with a minimum of 2 standards? |
| <u>—</u> | <u>—</u> | 4. Was an Initial Calibration Verification run prior to sample analysis run? |
| <u>—</u> | <u>—</u> | 5. Was an Initial Calibration Blank run after each Initial Calibration Verification? |
| <u>—</u> | <u>—</u> | 6. Was a CRI run at the beginning and end of sample analysis run? |
| <u>—</u> | <u>—</u> | 7. Were Interference Check Samples (ICSA and ICSAB) run at the beginning and end of sample analysis run? |
| <u>—</u> | <u>—</u> | 8. Was a Continuing Calibration Verification run after a maximum of 10 samples? |
| <u>—</u> | <u>—</u> | 9. Was a Continuing Calibration Blank run after each Continuing Calibration Verification? |
| <u>—</u> | <u>—</u> | 10. Did the Initial Calibration Verification/Continuing Calibration Verification meet the 10% control limit? |
| <u>—</u> | <u>—</u> | 11. Was the absolute value of the Initial Calibration Blank/Continuing Calibration Blank less than the CRDL? |
| <u>—</u> | <u>—</u> | 12. Were the results of the ICSAB within 20% of the true value? |

300481

Attachment 10

QA CHECKLIST - Metals by ICP, USEPA SOW

ICP:

Yes No

- | | | |
|----------|----------|---|
| <u>—</u> | <u>—</u> | 13. Was each sample within the calibration range? |
| <u>—</u> | <u>—</u> | 14. Did the Prep Blank meet criteria i.e. were results less than the absolute value of the CRDL? |
| <u>—</u> | <u>—</u> | 15. If the Prep Blank did not meet criteria, was the entire prep batch re-digested and re-analyzed? |
| <u>—</u> | <u>—</u> | 16. Was MS recovery within 75-125% limit? |
| <u>—</u> | <u>—</u> | 17. If MS Recovery was outside the QC limit was a Post Spike run? |
| <u>—</u> | <u>—</u> | 18. Was the Laboratory Control Sample within QC Limits? |
| <u>—</u> | <u>—</u> | 19. Was Sample/Duplicate RPD less than 20%? |
| <u>—</u> | <u>—</u> | 20. Was a Serial Dilution run for each batch of samples? |
| <u>—</u> | <u>—</u> | 21. Were the results of the Serial Dilution within 10% of the original determination? |

Attachment 11

QA CHECKLIST - Metals by Graphite Furnace AA, USEPA SOW

GRAPHITE FURNACE:

Yes No

- | | | |
|----------|----------|--|
| <u>—</u> | <u>—</u> | 1. Were all samples digested and analyzed within 180 days of sample collection? |
| <u>—</u> | <u>—</u> | 2. Were QC Samples (e.g. Laboratory Control Sample, Prep Blank, Spike Sample and Sample Duplicate) digested with each batch of 20 environmental samples? |
| <u>—</u> | <u>—</u> | 3. Were calibration standards and calibration check standards prepared daily? |
| <u>—</u> | <u>—</u> | 4. Was the instrument calibrated with a minimum of 4 standards? |
| <u>—</u> | <u>—</u> | 5. Was each calibration standard injected in duplicate? |
| <u>—</u> | <u>—</u> | 6. Was the duplicate injection less than 20% RPD? |
| <u>—</u> | <u>—</u> | 7. Were the results of the standard analysis within 5% of the true value? |
| <u>—</u> | <u>—</u> | 8. Was an Initial Calibration Verification run prior to sample analysis run? |
| <u>—</u> | <u>—</u> | 9. Was an Initial Calibration Blank run after each Initial Calibration Verification? |
| <u>—</u> | <u>—</u> | 10. Was a Contract Required Detection Limit Analysis run prior to sample analysis run? |
| <u>—</u> | <u>—</u> | 11. Was a Continuing Calibration Verification run after a maximum of 20 injections? |
| <u>—</u> | <u>—</u> | 12. Was a Continuing Calibration Blank run after each Continuing Calibration Verification? |
| <u>—</u> | <u>—</u> | 13. Did the Initial Calibration Verification/Continuing Calibration Verification meet the 10% control limit? |

300483

Attachment 11

QA CHECKLIST - Metals by Graphite Furnace AA, USEPA SOW

GRAPHITE FURNACE:

Yes No

- | | | |
|----------|----------|---|
| <u>—</u> | <u>—</u> | 14. Was the absolute value of the Initial Calibration Blank/Continuing Calibration Blank less the CRDL? |
| <u>—</u> | <u>—</u> | 15. Was each sample digestate injected in duplicate? |
| <u>—</u> | <u>—</u> | 16. Was the duplicate injection less than 20% RPD? |
| <u>—</u> | <u>—</u> | 17. Was each sample within the calibration range? |
| <u>—</u> | <u>—</u> | 18. Was each sample post spiked? |
| <u>—</u> | <u>—</u> | 19. Was the post spike recovery within 85-115? |
| <u>—</u> | <u>—</u> | 20. If the post spike recovery was not within acceptable limits, was the sample run by Method of Standard Addition? |
| <u>—</u> | <u>—</u> | 21. Were Method of Standard Addition requirements met? |
| <u>—</u> | <u>—</u> | 22. Did the Prep Blank meet criteria i.e. are results less than the absolute value of the CRDL? |
| <u>—</u> | <u>—</u> | 23. If the Prep Bland did not meet criteria, was the entire prep batch re-digested and re-analyzed? |
| <u>—</u> | <u>—</u> | 24. Was MS recovery within 75-125% limit? |
| <u>—</u> | <u>—</u> | 25. Was Sample/Duplicate RPD less than 20%? |
| <u>—</u> | <u>—</u> | 26. Was the Laboratory Control Sample within QC Limits? |

ENVIROTECH RESEARCH, INC.

Attachment 12 QA CHECKLIST - Mercury by Cold Vapor AA, USEPA SOW

COLD VAPOR:

Yes No

- | | | |
|----------|----------|---|
| <u>—</u> | <u>—</u> | 1. Were all samples digested and analyzed within 26 days of sample collection? |
| <u>—</u> | <u>—</u> | 2. Were QC Samples (e.g. Laboratory Control Sample, Prep Blank, Spike Sample and Sample Duplicate digested with each batch of 20 environmental samples? |
| <u>—</u> | <u>—</u> | 3. Was the instrument calibrated with a minimum of 5 standards? |
| <u>—</u> | <u>—</u> | 4. Was an Initial Calibration Verification run prior to sample analysis run? |
| <u>—</u> | <u>—</u> | 5. Was an Initial Calibration Blank run after each Initial Calibration Verification? |
| <u>—</u> | <u>—</u> | 6. Was a Contract Required Detection Limit Analysis run prior to sample analysis run? |
| <u>—</u> | <u>—</u> | 7. Was a Continuing Calibration Verification run after a maximum of 10 samples? |
| <u>—</u> | <u>—</u> | 8. Was a Continuing Calibration Blank run after each Continuing Calibration Verification? |
| <u>—</u> | <u>—</u> | 9. Did the Initial Calibration Verification/Continuing Calibration Verification meet the 20% control limit? |
| <u>—</u> | <u>—</u> | 10. Was the absolute value of the Initial Calibration Blank/Continuing Calibration Blank less than the CRDL? |
| <u>—</u> | <u>—</u> | 11. Was each sample within the calibration range? |
| <u>—</u> | <u>—</u> | 12. Did the Prep Blank meet criteria i.e. were the results less than the absolute value of the CRDL? |

300485

ENVIROTECH RESEARCH, INC.

Attachment 12
QA CHECKLIST - Mercury by Cold Vapor AA, USEPA SOW

COLD VAPOR:

Yes No

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 13. If the Prep Blank did not meet criteria, was the entire prep batch re-digested and re-analyzed? |
| <input type="checkbox"/> | <input type="checkbox"/> | 14. Was MS recovery within 75-125% limit? |
| <input type="checkbox"/> | <input type="checkbox"/> | 15. Was Sample/Duplicate RDP less than 20%? |
| <input type="checkbox"/> | <input type="checkbox"/> | 16. Was the Laboratory Control Sample within QC limits? |

300486

ENVIROTECH RESEARCH SOP No. D100
STANDARD OPERATING PROCEDURE FOR
DATA MANAGEMENT AND HANDLING PROCEDURES

doc: D100
Revision: B

300487

1. SCOPE and APPLICATION

- 1.1. This SOP outlines the steps taken to eliminate data entry errors and to maintain the security of the databases and data systems.
- 1.2. The mechanism for tracking sections of data packages is also discussed.

2. PROCEDURE

2.1. CONTROLLING AND ESTIMATING DATA ENTRY ERRORS

- 2.1.1. The data reporting system is designed to input analytical results directly from analytical instruments via a network. This minimizes the number of transcriptions which in turn minimizes the potential for a reporting error.
- 2.1.2. Reviewed, processed data is uploaded from instruments to the appropriate reporting database.
- 2.1.3. Data that must be manually entered is checked by an individual other than the person who entered the data. Any errors found are highlighted with a red marker and the corner of the page is turned down so that it cannot be used again. The corrected page is checked against the original after the correction is made.

2.2. REVIEWING CHANGES TO DATA AND DELIVERABLES AND ENSURING TRACEABILITY OF UPDATES

- 2.2.1. All data in the Document Management Office including data which is to be used in the production of the data report is the responsibility of the Document Control Officer.
- 2.2.2. Data repositories such as instrument run logs, extraction logbooks and maintenance logs are kept in bound, paginated books. The signature of the responsible analyst is subjected to verification by the respective supervisor. Logbooks which become filled are stored in a secured cabinet in the laboratory.
- 2.2.3. As data is produced, it may be tracked through an individual department by means of the information contained in the job folder and the run logs or extraction logs maintained in the individual department.

- 2.2.4. The reporting databases are secured by means of a password protection system that accounts for any changes that are made to the database. An audit trail is created to reconstruct what changes were made and who made them.
- 2.2.5. The job folder acts as the repository for all data pertaining to the specific group of samples. After the report is sent out, the Document Control Officer archives the job folder in increasing job number order. The job folders are kept on site for a period of not less than five years and are easily accessible if information is requested at a later date.
- 2.3. TESTING, MODIFYING, AND IMPLEMENTING CHANGES TO EXISTING COMPUTER SYSTEMS INCLUDING HARDWARE, SOFTWARE, AND DOCUMENTATION OR INSTALLING NEW SYSTEMS.
 - 2.3.1. All modifications to computer systems or new system installations are coordinated by the System Manager.
 - 2.3.2. Initially, a meeting is held with but not limited to the System Manager, Lab Manager, Quality Control Officer, and pertinent department supervisors. System enhancements and development are discussed and organized at this meeting. Upon satisfactory agreement of all parties, the scope of the development is defined.
 - 2.3.3. Testing is performed throughout the development cycle by the development staff. Depending on the scope of the System Development Project, lab personnel will be involved with testing either throughout the development cycle or at the end for final testing and approval.
 - 2.3.4. Where possible, any new or modified systems are tested side-by-side with existing systems to ensure accuracy and to limit the introduction of new and unforeseen 'bugs.'
 - 2.3.5. Documentation is maintained during the development cycle for system administration and maintenance purposes. End-user documentation is created at the end of the cycle to be included with any end-user training needed. In addition, any SOPs which are affected by these changes are modified.
 - 2.3.6. Finally, upon approval of the Lab Manager and the Quality Control Officer, the new development or modifications are implemented and become standard operating procedure.

2.4. DATABASE SECURITY, BACKUP AND ARCHIVAL

- 2.4.1. All electronic data is archived from analytical instruments and data reporting databases using a variety of media ranging from cassette tapes for GC and GC/MS data to cassette tapes and floppy disks for metals data. Archived data is indexed and cross referenced to instrument run logs to facilitate retrieval if necessary.
- 2.4.2. All data is archived in duplicate. One copy is maintained at the main facility for quick retrieval and the other copy is maintained at a remote location for disaster recovery.
- 2.4.3. Database security is maintained by limiting access rights through password protection. In general, users are granted the minimum amount of privilege needed to perform their respective job functions.
- 2.4.4. Audit Trails are maintained on all databases to monitor data manipulation and modifications.

2.5. SYSTEM MAINTENANCE

- 2.5.1. All routine maintenance procedures are documented in a manual which is maintained by the System Manager. This manual contains step-by-step procedures for administering critical system activities including; backups, retrievals, user maintenance, and security procedures.

Hardware

- 2.5.2. Data systems are continually monitored by the System Manager to ensure proper operation and full functionality.
- 2.5.3. Where critical, redundancies are built-in to the system to maintain full system operation in the event of a critical hardware failure. These redundancies usually involve maintaining a backup system, which can replace a main system until that main system is repaired or replaced.
- 2.5.4. Where possible and cost-effective, replacement hardware is stock-piled for emergency.
- 2.5.5. Backup systems are routinely tested, specifically when normal system maintenance requires the shutdown of the main systems.

- 2.5.6. Maintenance contracts are maintained with vendors for all critical hardware.
- 2.5.7. Response times for in-house maintenance are not more than six hours. Response times for maintenance contracts are not more than 24 hours.
- 2.5.8. All systems are protected against electronic surges or spikes and critical systems are protected by Uninterruptible Power Supplies in the event of power failures.

Software

- 2.5.9. Telephone support contracts are maintained with vendors for all critical systems software. Response time for critical problems is not more than 4 hours
- 2.5.10. A close working relationship is maintained with all critical software vendors to ensure software compliance with all methods and certifications.
- 2.5.11. Custom software is developed and maintained by the in-house staff, where a suitable third-party package can not be found.
- 2.5.12. All electronic media which enters or leaves the lab, is checked against the latest anti-virus software packages.

2.6. SYSTEM MANAGEMENT RESPONSIBILITY

2.6.1. SYSTEM MANAGER

Responsibilities include:

- 2.6.1.1. The maintenance of all system hardware including but not limited to; computers, network hardware, printers, and other peripherals
- 2.6.1.2. Ensuring the proper operation, installation, and availability of all software such as; database management systems, data reporting, data acquisition, general office packages, operating systems, and network operations.
- 2.6.1.3. The operation and availability of the computer network
- 2.6.1.4. Data backup, archival, and retrieval.

2.6.1.5. System and Database Security.

2.6.1.6. Evaluation, acquisition, and implementation of new systems and software.

2.6.1.7. All in-house software development

2.6.1.8. Technical and Software Support

2.6.1.9. General end-user training.

2.6.2. DATA SYSTEMS ADMINISTRATOR

Responsibilities include:

2.6.2.1. Software compliance with existing Certifications and Contracts

2.6.2.2. Data Integrity

2.6.2.3. Data Systems Operations

2.6.2.4. Data System Support and Training.

2.7. STAFF TRAINING PROCEDURES

2.7.1. Staff training in data systems is the responsibility of the respective department supervisor. Where such media exists, training videos or multimedia presentations are used to introduce the trainee to the data system or software application. The user is then given any SOP or software documentation available as additional introduction to the system.

2.7.2. After initial exposure, a system expert will provide one-on-one support to the trainee detailing the specific operation of the package and how the system is to be used to perform the job at hand.

2.7.3. Upon satisfactory completion of the training, the trainee's supervisor will determine if the user is ready to work or if more training is needed.

2.7.4. When the new user's training is approved, a password and security privileges are assigned and the new user is allowed to work with the system.

ENVIROTECH RESEARCH SOP No. D101
STANDARD OPERATING PROCEDURE FOR
DOCUMENT CONTROL PROCEDURES

doc: D101
Revision:

300493

1. SCOPE and APPLICATION

- 1.1. This procedure addresses the mechanism for centralizing the documents supporting a sample submission and for retrieval of these documents.
- 1.2. This procedure also addresses the maintenance of all notebooks used in the laboratory.

2. PROCEDURE

2.1. Accounting for supporting documents for a sample submission

- 2.1.1. A group of samples submitted for analysis are assigned an Envirotech Research Job No. in accordance with SOP No. S103. The Job No. is the primary key which is used to retrieve information pertinent to the sample submission.
- 2.1.2. A job folder is created when a group of samples are received. It is kept in the Document Management Office while the analysis is in progress. Internal and external sample control documents are kept in this folder including Chain of Custody documents. Raw instrument data specific to the samples in the group are also deposited in the job folder. These documents specify the dates and times the samples were prepared or analyzed which provides a cross reference to the appropriate laboratory logbooks.
- 2.1.3. An individual wishing to retrieve job specific information need only to look at the job folder. If further information is required, the laboratory notebooks may be examined by the cross reference provided in the job folder. The instrument run logs also give an indexed key to achieved analytical data stored on reel to reel tape, cassette tape or diskette. Other documents include the following:

- Extraction Logs
- Preventive Maintenance Logs
- Balance Logs
- Standards Prep Logs
- Laboratory Notebooks

- 2.1.4. After a job is completed and the final data report is sent to the client, the entire job folder is sequentially archived for not less than five years and is easily accessible if information is required at a later date.

2.2. Laboratory Logbooks

- 2.2.1. The laboratory logbooks provide the most basic and fundamental information about sample preparation and analysis, the various maintenance measures taken and standard preparation information. All laboratory notebooks are bound, paginated filled out in black pen only and subject to signature authentication procedures.
- 2.2.2. Separate logbooks are dedicated to separate procedures, functions and instruments.
- 2.2.3. The information contained in the logbooks are unique to the operation to which they are dedicated. Logbooks maintained for sample preparation or instruments logs will contain the information pertinent to the function they are used for in accordance with the analytical SOP. These logbooks will all contain at a minimum, however, the date, sample number and job number and signature for the responsible party. The logbooks will be maintained in a sequential manner.
- 2.2.4. Logbooks which become filled are archived in a secured cabinet in the laboratory.

ENVIROTECH RESEARCH, INC.

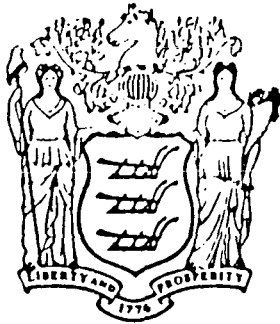
Laboratory Certification

Information is enclosed on laboratory certifications and approvals for Envirotech Research, Inc. Documentation of these governmental approvals is enclosed, as follows:

- State of New Jersey Certification (No. 12543)
- State of New York Certification (No. 11452)
including New York ASP-CLP accreditation
- State of Pennsylvania Certification (No. 68-522)
- U.S. Army Corps of Engineers Validation
- State of Delaware DNREC Superfund Approval
- State of Rhode Island License
- Department of Agriculture Permit #S-4479
(to Receive International Shipments of Soil for Testing)

Laboratory certification insures that standards relating to personnel, facilities, data reporting, testing methodology and quality control procedures meet criteria adopted by the States of New Jersey, New York, Delaware and the U.S. Army Corps of Engineers. To maintain these certifications Envirotech Research, Inc. has continually analyzed performance evaluation samples acceptably and has passed intensive laboratory audit programs.

300496



DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certifies That

Envirotech Research, Inc.
777 New Durham Road
Edison, New Jersey 08817



*having duly met the requirements of the
Regulations Governing Laboratory Certification
And Standards Of Performance N.J.A.C. 7:18 et. seq.*

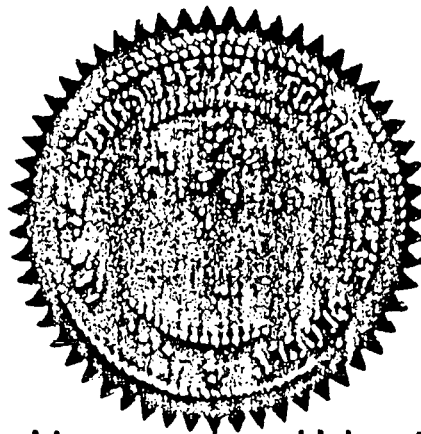
is hereby approved as a

State Certified Water Laboratory

*To perform the analyses as indicated on the Annual Certified Parameter List
which must accompany this certificate to be valid*

#12543
PERMANENT CERTIFICATION NUMBER

May 2, 1988
DATE



[Signature]
COMMISSIONER
DEPARTMENT OF ENVIRONMENTAL PROTECTION

300497

This certification is subject to unannounced laboratory inspections as specified by
N.J.A.C. 7:18-2.11(d) and agreed to by the Laboratory Manager on filing the application

TO BE CONSPICUOUSLY DISPLAYED AT THE LABORATORY WITH THE ANNUAL CERTIFIED PARAMETER LIST.



State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

October 4, 1995

Envirotech Research, Inc.
Envirotech Research/Div.AFF.EN
777 New Durham Road
Edison, NJ 08817

Manager: Michael J. Urban

Lab ID# 12543

Dear Mr. Urban:

Enclosed is your 1995-96 Annual Certified Parameter List. This list replaces the 1994-95 form and must be conspicuously displayed at the laboratory, along with your permanent Laboratory Certificate.

Your cooperation in this matter is appreciated.

Sincerely,
Dottie Correnti
Dottie Correnti
Administrative Analyst I
Bureau of Revenue

DCP:ch-208
Enclosure
cc: Jerry Bundy

300498

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF QUALITY ASSURANCE
ANNUAL CERTIFIED PARAMETER LIST FOR 1995-1996

ENVIROTECH RESEARCH, INC.
ENVIROTECH RESEARCH/DIV.AFF.EN

(12543)

IS CERTIFIED TO PERFORM THE ANALYSES
BELOW UNTIL JUNE 30 1996.

DRINKING WATER LABORATORY CERTIFICATION

LIMITED CHEMISTRY

- 950 ODOR, CONSISTENT SERIES
- 951 PH, GLASS ELECTRODE
- 952 TOT DISS SOLIDS, TOT RES

METALS

- 901 BA, ATOMIC ABSORPTION
- 902 AG, ATOMIC ABSORPTION
- 903 CU, ATOMIC ABSORPTION
- 904 FE, ATOMIC ABSORPTION
- 906 ZN, ATOMIC ABSORPTION
- 912 HG, MANUAL COLD VAPOR
- 914 AS, GRAPHITE FURNACE
- 915 BA, GRAPHITE FURNACE
- 916 CD, GRAPHITE FURNACE
- 917 CR, GRAPHITE FURNACE
- 918 PB, GRAPHITE FURNACE
- 920 SE, GRAPHITE FURNACE

DRINKING WATER LABORATORY CERTIFICATION

METALS

921 AG, GRAPHITE FURNACE
922 CU, GRAPHITE FURNACE
923 FE, GRAPHITE FURNACE
924 MN, GRAPHITE FURNACE
925 ZN, GRAPHITE FURNACE
954 NA, ATOMIC ABSORPTION
961 BARIUM, ICAP
962 CADMIUM, ICAP
963 CHROMIUM, ICAP
965 SILVER, ICAP
966 COPPER, ICAP
967 IRON, ICAP
968 MANGANESE, ICAP
969 ZINC, ICAP

ORGANICS

502.2 VOC (PT/GC)
5151H REG HERBS/PENTACHLOROPHEN
524.2 VOC (PT/GC-MS)

WATER POLLUTION LABORATORY CERTIFICATION

LIMITED CHEMISTRY

00010 TEMPERATURE

WATER POLLUTION LABORATORY CERTIFICATION

LIMITED CHEMISTRY

00076 TURBIDITY
00095 SPECIFIC CONDUCTANCE
00300 DISS OXYGEN-WINKLER
00340 COD
00400 HYDROGEN ION-PH
00410 ALKALINITY
00436 ACIDITY
00500 TOT SOLIDS
00505 TOT VOLATILE SOLIDS
00530 SUSP SOLIDS
00556 OIL AND GREASE
00610 AMMONIA NITROGEN
00615 NITRITE
00630 NITRATE
00650 PHOSPHORUS, TOT AS PO4
00660 ORTHOPHOSPHATE AS PO4
00665 PHOSPHORUS, TOT AS P
00671 ORTHOPHOSPHATE AS P
00680 ORGANIC CARBON, TOTAL
00681 ORGANIC CARBON, DISSOLVED
00720 CYANIDE, TOTAL
00722 CYANIDE, AMEN TO CHLOR

WATER POLLUTION LABORATORY CERTIFICATION

LIMITED CHEMISTRY

00745 SULFIDE
00900 HARDNESS
00940 CHLORIDE
00945 SULFATE
00951 FLUORIDE, TOTAL
01032 CR HEX
32730 PHENOLS
50060 CHLORINE RESIDUAL
70300 TOT DISS SOLIDS

METALS

00915 CALCIUM (ICAP)
00916 CALCIUM (AA)
00925 MAGNESIUM (ICAP)
00927 MAGNESIUM (AA)
00929 SODIUM (ICAP)
00930 SODIUM (AA)
00935 POTASSIUM (ICAP)
00937 POTASSIUM (AA)
01000 ARSENIC (ICAP)
01002 ARSENIC (AA/GF)
01005 BARIUM (ICAP)

WATER POLLUTION LABORATORY CERTIFICATION

METALS

01007 BARIUM (AA/GF)
01010 BERYLLIUM (ICAP)
01012 BERYLLIUM (AA/GF)
01025 CADMIUM (ICAP)
01027 CADMIUM (AA/GF)
01030 CHROMIUM (ICAP)
01032 CHROMIUM VI (AA)
01034 CHROMIUM (AA/GF)
01035 COBALT (ICAP)
01037 COBALT (AA/GF)
01040 COPPER (ICAP)
01042 COPPER (AA/GF)
01045 IRON (ICAP)
01046 IRON (AA/GF)
01049 LEAD (ICAP)
01051 LEAD (AA/GF)
01055 MANGANESE (ICAP)
01056 MANGANESE (AA/GF)
01059 THALLIUM (AA/GF)
01060 MOLYBDENUM (ICAP)
01062 MOLYBDENUM (AA/GF)
01065 NICKEL (ICAP)

WATER POLLUTION LABORATORY CERTIFICATION

METALS

01067 NICKEL (AA/GF)
01075 SILVER (ICAP)
01077 SILVER (AA/GF)
01085 VANADIUM (ICAP)
01087 VANADIUM (AA/GF)
01090 ZINC (ICAP)
01092 ZINC (AA/GF)
01097 ANTIMONY (AA/GF)
01102 TIN (AA/GF)
01105 ALUMINUM (ICAP)
01106 ALUMINUM (AA/GF)
01145 SELENIUM (ICAP)
01147 SELENIUM (AA/GF)
01152 TITANIUM (AA/GF)
71900 MERCURY (CCLD VAPOR)

ORGANICS

601 PURGEABLE HALOCARBONS (GC)
602 PURGEABLE AROMATICS (GC)
608 PESTICIDES & PCBS (GC)
624 PURGEABLES (GC/MS)
625 B/N, ACIDS & PEST (GC/MS)

THIS LIST MUST BE CONSPICUOUSLY DISPLAYED WITH THE PERMANENT
CERTIFICATE AT THE LABORATORY

BARBARA A. DEBUONO M.C. M.P.H. Commissioner



Expires 12:01 AM April 1, 1996

ISSUED April 1, 1995

REVISED June 30, 1995

INTERIM CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11452

Director: MR. MICHAEL URBAN

Lab Name: ENVIROTECH RESEARCH INC

Address : 777 NEW DURHAM ROAD

EDISON NJ 08817

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES NON POTABLE WATER

All approved subcategories and/or analytes are listed below:

Hydrocarbon Pesticides :	Wastewater Miscellaneous :	Wastewater Metals III :	Nutrient :
4'-DDD	Bromide	Gold, Total	Ammonia (as N)
4'-DDE	Boron, Total	Cobalt, Total	Nitrite (as N)
4'-DDT	Cyanide, Total	Molybdenum, Total	Nitrate (as N)
alpha-BHC	Color	Tin, Total	Orthophosphate (as P)
lindrin	Corrosivity	Titanium, Total	Phosphorus, Total
beta-BHC	Phenols	Tellurium, Total	Demand :
Chlordane Total	Oil & Grease Total Recoverable	Acrolein and Acrylonitrile (ALL)	Chemical Oxygen Demand
delta-BHC	Hydrogen Ion (pH)	Fenitridines (ALL)	Chlorophenox Acid Pesticides (ALL)
ieldrin	Specific Conductance	Chlorinated Hydrocarbons (ALL)	Haloethers (ALL)
lindrin aldehyde	Sulfide (as S)	Wastewater Metals I (ALL)	Wastewater Metals II (ALL)
lindrin	Temperature	Mineral (ALL)	Nitroaromatics and Isophorone (ALL)
Endosulfan I	Organic Carbon, Total	Nitrosamines (ALL)	Polynuclear Aromatics (ALL)
Endosulfan II	Polychlorinated Biphenyls (ALL)	Phthalate Esters (ALL)	Priority Pollutant Phenols (ALL)
Endosulfan sulfate	Purgeable Aromatics (ALL)	Purgeable Halocarbons (ALL)	Residue (ALL)
Heptachlor	TCLF Additional Compounds (ALL)		
Heptachlor epoxide			
lindane			
Heptachlor			
lindane			

Serial No.: 027319

Wadsworth Center for Laboratories and Research

Property of the New York State Department of Health. Valid only at the address shown.

300505

Must be conspicuously posted. Valid certificate has a red serial number.

~~MARY R. CHASSIN, M.D., M.P.H., M.D.H. Commissioner~~

BARBARA A. DEBUONO, M.P.H. Commissioner



Expires 12:01 AM April 1, 1996
 ISSUED April 1, 1995
 REVISED June 30, 1995

INTERIM CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11452

Director: MR. MICHAEL URBAN
 Lab Name: ENVIROTECH RESEARCH INC
 Address : 777 NEW DURHAM ROAD
 EDISON NJ 08817

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/ POTABLE WATER

All approved subcategories and/or analytes are listed below:

Drinking Water Non-Metals :	Drinking Water Trihalomethane (ALL)	Drinking Water Metals I (ALL)	Drinking Water Metals II (ALL)
Alkalinity	Volatile Aromatics (ALL)	Volatile Halocarbons (ALL)	
Calcium Hardness			
Chloride			
Cyanide			
Color			
Corrosivity			
Fluoride, Total			
Nitrite (as N)			
Nitrate (as N)			
Unadjusted Ion (pH)			
Solids, Total Dissolved			
Sulfate (as SO4)			

Serial No.: 027320

Wadsworth Center for Laboratories and Research

Property of the New York State Department of Health. Valid only at the address shown.

300506

Must be conspicuously posted. Valid certificate has a red serial number.

~~NEW YORK STATE DEPARTMENT OF HEALTH~~ COMMISSIONER

BARBARA A. DEBUONO, M.P.H. Commissioner



Expires 12:01 AM April 1, 1996
ISSUED April 1, 1995
REVISED June 30, 1995

INTERIM CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE*Issued in accordance with and pursuant to section 502 Public Health Law of New York State*

Lab ID No.: 11452

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Lab Name: ENVIROTECH RESEARCH INC
Address: 777 NEW DURHAM ROAD
EDISON NJ 08817

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/SOLID AND HAZARDOUS WASTE

All approved subcategories and/or analytes are listed below:

Characteristic Testing:	Miscellaneous:	Acrolein and Acrylonitrile (ALL)	Chlorophenoxy Acid Pesticides (ALL)
Corrosivity	Cyanide, Total	Chlor. Hydrocarbon Pesticides (ALL)	Chlorinated Hydrocarbons (ALL)
Ignitability	Lead in Paint	Ethers (ALL)	Metals I (ALL)
Reactivity	Hydrogen Ion (pH)	Metals II (ALL)	Nitroaromatics Isopropyl (ALL)
CLF	Sulfide (as S)	Polynuclear Arom. Hydrocarbon (ALL)	Polychlorinated Biphenyls (ALL)
A.P. Toxicity	Phthalate Esters (ALL)	Priority Pollutant Phenols (ALL)	Purgeable Aromatics (ALL)
Unstable Halocarbons (ALL)			

Serial No.: 027321

Wadsworth Center for Laboratories and Research

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300507

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NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner



Expires 12:01 AM April 1, 1996
ISSUED October 5, 1995
REVISED October 6, 1995

INTERIM CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11452

Director: MR. MICHAEL URBAN
Lab Name: ENVIROTECH RESEARCH INC
Address : 777 NEW DURHAM ROAD
EDISON NJ 08817

is hereby APPROVED as an Environmental Laboratory for the category

CONTRACT LABORATORY PROTOCOL (CLP)

All approved subcategories and/or analytes are listed below:

CLP Inorganics

CLP PCB/Pesticides

CLP Semi-Volatile Organics

CLP Volatile Organics

Serial No.: 031511

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown.
Must be conspicuously posted. Valid certificate has a red serial number.

300508

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

OFFICE OF MANAGEMENT AND TECHNICAL SERVICES

BUREAU OF LABORATORIES

Certifies that

ENVIROTECH RESEARCH INC
777 NEW DURHAM RD
EDISON NJ 08817
68-522

having duly met the requirements of
Chapter 109, Subchapter H, Safe Drinking Water Rules and Regulations
issued under the Pennsylvania Safe Drinking Water Act of May 1, 1984
(P.L. 206, No. 43), (35 P.S. SS 721.1 - 721.17)
is hereby approved as a

Certified Drinking Water Laboratory

to perform the following analyses:

Inorganic
Trace Metals (Groups 1,2), Fluoride, Cyanide

Organic
Total Trihalomethanes

Expiration Date: 2/9/97

300509

Certificate not transferable
Surrender upon revocation
To Be Conspicuously Displayed at the Laboratory


Floyd Kefford, Bureau Director
Bureau of Laboratories

154



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS — MRD
HTRW MANDATORY CENTER OF EXPERTISE
12565 WEST CENTER ROAD
OMAHA, NEBRASKA 68144-3869

REPLY TO
ATTENTION OF

February 28, 1995

Environmental, Hazardous, Toxic
and Radioactive Waste Division

Envirotech Research, Inc.
777 New Durham Road
Edison, New Jersey 08817

Gentlemen:

This correspondence addresses the recent evaluation of your laboratory by the U.S. Army Corps of Engineers (USACE) for chemical analysis in support of the USACE Hazardous and Toxic Waste Program.

Envirotech Research, Inc., has successfully analyzed the project required performance evaluation (PE) samples as listed below:

<u>METHOD</u>	<u>PARAMETERS</u>	<u>MATRIX</u>
8240A	Volatile Organics	Water
8270A	Semi-Volatile Organics	Water
8270A	Semi-Volatile Organics	Soil
8080	Pesticides	Water
8080	PCBs	Water
8080	PCBs	Soil
8150	Herbicides	Water
SW-846	Metals - 13 PP + Ba ¹	Water
SW-846	Metals - 13 PP + Ba ¹	Soil
418.1	TRPH	Water
9071/418.1	TRPH	Soil
9010	Cyanide	Water

Remarks: 1 Metals-Thirteen Priority Pollutant Metals plus Barium: antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.

Enclosed for your information is a copy of the Laboratory Inspection and Evaluation Report. Your laboratory has responded to the deficiencies as noted in the report.


300510

Based on the successful analysis of the project specific PE samples indicated in the table in paragraph two above and the results of the laboratory inspection, Envirotech Research, Inc., is validated for multimedia sample analysis by the methods listed above. The period of validation is eighteen (18) months and expires on July 13, 1996.

USACE reserves the right to conduct additional laboratory auditing or to suspend validation status for any or all of the listed parameters if deemed necessary. It should be noted that your laboratory may not subcontract USACE analytical work to any other laboratory location without approval of this office. This laboratory validation does not guarantee the delivery of any analytical samples from a USACE Contracting Officer.

If you have any questions or comments regarding this specific validation activity, please contact Dr. Anand Mudambi at (402) 697-2571. General questions or comments with regard to your lab's validation status should be directed to Ms. Elena Webster at (402) 697-2574.

Sincerely,


Marcia C. Davies, Ph.D.
Director, USACE Hazardous,
Toxic and Radioactive Waste
Mandatory Center of Expertise

Enclosure



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
DIVISION OF AIR AND WASTE MANAGEMENT
715 GRANTHAM LANE
NEW CASTLE, DELAWARE 19720-4801

WASTE MANAGEMENT SECTION
SUPERFUND BRANCH

TELEPHONE: (302) 323-4540
FAX: (302) 323-4561

March 3, 1993

Mark Haulenbeck, Vice President
Envirotech Research Inc.
777 New Durham Road
Edison, New Jersey 08817

Subject: HSCA Laboratory Selection

Dear Mr. Haulenbeck:

Thank you for your letter and attachments of January 25, 1993 regarding Envirotech Research Inc.'s response to my on-site evaluation report dated January 6, 1993. Envirotech Research Inc. successfully completed and fulfilled all necessary requirements to be approved for analytical services under the Hazardous Substance Cleanup Act for the Superfund Branch, of the State of Delaware.

Envirotech Research Inc. will be placed on a list of laboratories to provide analytical support to potentially responsible parties or their consultants on Delaware Superfund sites.

Please find enclosed, a copy of the State of Delaware's Standard Operating Procedures for Chemical Analytical Programs. I would appreciate any comments that you may have pertaining to this document. I look forward to developing a positive working relationship. If you have any further questions, please call me at (302) 323-4540.

Sincerely,

Robert M. Schulte
Environmental Scientist/Laboratory Specialist
Superfund Branch

RMS/mlb
RMS93022

Enclosure

pc: Stephen N. Williams

300512

Delaware's good nature depends on you!

State of Rhode Island and Providence Plantations
DEPARTMENT OF HEALTH

Audit N^o 0196



License No. 132

This is to certify that ENVIROTECH RESEARCH, INC
777 New Durham Road
Edison, New Jersey 08817

is licensed to operate a

Analytical Laboratory

Envirotech Research, Inc.

in conformity with Chapter 39 of Title 23 of the General Laws of Rhode Island, as amended.

It has demonstrated its proficiency in the performance of the following . . . One . . . categories of laboratory tests:

Chemistry

Patricia A. Nolan, MD, MPH

Director of Health

300513

Expires, June 30, 1997.

ISSUED . 1 July 1995

Laboratory: ENVIROTECH RESEARCH, INC
Address: 777 New Durham Road, Edison, NJ 08817
Date Issued: July 1, 1995
Date Expires: June 30, 1997

I. Potable Water:

B. Trace Metals: Aluminum; Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Copper; Lead; Manganese; Mercury; Molybdeum; Nickel; Selenium; Silver; Thallium; Zinc

C. Inorganics: Nitrate as N; Nitrite as N; Fluoride; Residual Chlorine; Turbidity; Total Filterable Solids; Calcium; pH; Alkalinity; Sodium; Corrosivity; Sulfate Cyanide;

D. Trihalomethanes

H. Herbicides

I. Volatile Organic Compounds:

II. Non-potable and Waste Waters:

B. Trace Metals: Aluminum; Arsenic; Beryllium; Cadmium; Cobalt; Chromium; Copper; Iron; Mercury; Manganese; Nickel; Lead; Selenium; Vanadium; Zinc; Antimony; Silver; Thallium; Molybdenum; Strontium; Titanium

C. Minerals: pH; Specific Conductance; Total Dissolved Solids; Hardness; Calcium; Magnesium; Sodium; Potassium; Alkalinity; Chloride; Fluoride; Sulfate

D. Nutrients: Ammonia N.; Nitrate N.; Ortho Phosphate; Kjeldahl N.; Total Phosphorus

E. Demands: Chemical Oxygen Demand; Total Organic Carbon; 5-Day BOD; Carbonaceous BOD

F. Miscellaneous: Total Cyanide; Non-Filterable solids; Oil and grease; Total Phenolics; Total Residual Chlorine

G. PCB's in water Matrix

H. PCB's in oil Matrix

I. Chlorinated Hydrocarbon Pesticides

J. Volatile Halocarbons

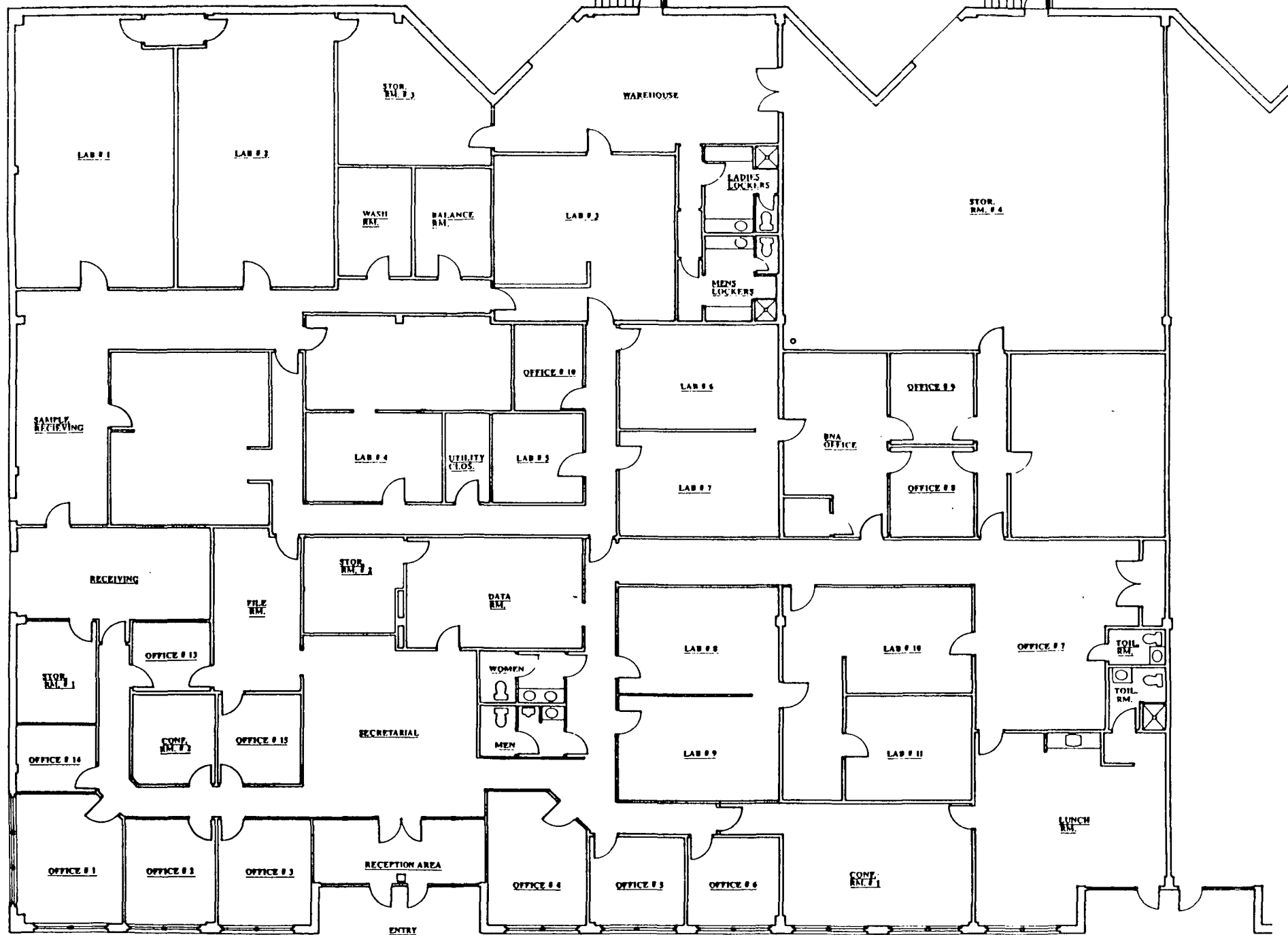
K. Volatile Aromatics

L. Acid Extractables

M. Base Neutral Extractables

300515

Previous editions are obsolete



300517

ENVIROTECH RESEARCH, INC.

Major Instrumentation and Equipment

- 8 - Hewlett Packard 5970 and 5971 mass spectrometers interfaced with 5890 gas chromatographs
- 3 - Hewlett Packard RISC-UNIX workstations for GC/MS and GC data management and custom forms generation
- 6 - Tekmar ALS VOA purge and trap autosamplers
- 3 - Hewlett Packard 5890 gas chromatographs with dual column/dual auto injector capability and dual electron capture detectors, each with dedicated computerized Chemstation for instrument control and data management
- 3 - Hewlett Packard 5890 gas chromatographs with dual flame ionization detectors
- 2 - Hewlett Packard 5890 gas chromatographs with flame ionization detector and tandem photoionization detector and electrolytic conductivity detector
- 1 - Zymark Gel Permeation Cleanup System
- 1 - Perkin Elmer 5100 atomic absorption spectrophotometer with flame and graphite furnace capability
- 1 - Perkin Elmer 4100 graphite furnace atomic absorption spectrophotometer
- 1 - ARL 3400 inductively coupled argon plasma (ICAP) emission spectrophotometer
- 1 - Thermo Jarrell Ash ICAP 61E "Trace" emission spectrophotometer
- 1 - Leeman Labs PS200 Automated Mercury Analyzer
- 1 - Spectro Products Mercury Analyzer
- 1 - Perkin Elmer 1600 Series Fourier Transform Infrared Spectrophotometer
- 1 - Dohrman DC-80 Total Organic Carbon Analyzer with optional sludge/sediment and purgeable organic carbon capability
- 2 - Sequoia-Turner Model 340 Spectrophotometers

Full RCRA characteristic testing capability, including: TCLP/ZHE extractors, Setaflash flashpoint tester, Reactivity and Corrosivity test equipment

300518

Computing Capabilities

Hardware

Our Local Area Network is comprised of 9 Unix Workstations, a Novell Netware 3.12 Server, 4 HP-RTE Minicomputers, and over 35 IBM-type PCs (486 or better).

Software Capabilities

Operating Environments

Unix (HP-UX and SCO)
DOS/Windows 3.1
HP-RTE

Network Environments

Novell Netware 3.12
TCPIP
10BaseT-Ethernet

Office Software

Microsoft Word 6.0 for Windows
Microsoft Excel 5.0 for Windows
Microsoft Powerpoint 4.0 for Windows
Aldus PageMaker

Scientific Software

HP GC Chemstation
HP MS Chemstation
HP RTE-Aquarius
Target 3.1
Envision 3.2
Ward Scientific

Development Software

PowerBuilder 4.0
Turbo C++

Database Management Software

Informix
Ingres

ENVIROTECH RESEARCH, INC.

Computer Location: BNA 1 Lab

Network Wire: L7

Motherboard: 80484DX2-66

Floppy Drive 1: Teac 1.2 MB

Hard Drive 1: WD 540 MB

Tape:

Network Card: Novell S/N:086166

Video Card: Trident 2Mb SVGA

Mouse: Microsoft Mouse

Case: Desktop

Hub Location: T10

Ram (MB): 16

Floppy Drive 2: Teac 1.44 Mb

Hard Drive 2:

I/O Card: Generic S/N:WD37C

Network Address:

Monitor: Optiquet 17"

Keyboard: Keytronic 101

Computer Location: BNA 2 Lab

Network Wire: L13

Motherboard: 80486DX2-66

Floppy Drive 1: Teac 1.44 Mb

Hard Drive 1: WD 540 MB

Tape:

Network Card: Novell

Video Card: Trident 2Mb SVGA

Mouse: Microsoft

Case: Desktop

Hub Location: C16

Ram (MB): 16

Floppy Drive 2: Teac 1.2 Mb

Hard Drive 2:

I/O Card: Generic

Network Address:

Monitor: Optiquet 17"

Keyboard: Keytronic 101

300520

ENVIROTECH RESEARCH, INC.

Computer Location: BNA 3 Lab

Network Wire: L9	Hub Location: T13
Motherboard: 80486DX4-100	Ram (MB): 16
Floppy Drive 1: TEAC 1.44 3.5 -W595848	Floppy Drive 2:
Hard Drive 1: WD 425 MB VT681010071	Hard Drive 2:
Tape:	I/O Card: VLB IDE 9316600
Network Card: Multi-Tech EN301T16 - 100330	Network Address:
Video Card: Trident 2Mb VLP VGA GUIZ432K14702	Monitor: OptiQuest 4000DS 0241201419
Mouse: Kensington Expert Mouse	Keyboard: Keytronic J943700767
Case: Desktop	

Computer Location: BNA GC Instrument

Network Wire: L20	Hub Location: T3
Motherboard: 80486DX-33	Ram (MB): 8
Floppy Drive 1: TEAC 1.2 Mb 5.25	Floppy Drive 2: TEAC 1.44 Mb 3.5
Hard Drive 1: Maxtor 170 Mb	Hard Drive 2:
Tape:	I/O Card:
Network Card: Multitech	Network Address:
Video Card: Trident Local Bus SVGA	Monitor: ADI Microscan 3g
Mouse: Kensington Mouse	Keyboard: Key-Tronic 101 Keyboard
Case: Desktop	

300521

ENVIROTECH RESEARCH, INC.

Computer Location: Bookkeeper's Office

Network Wire: 010

Motherboard: 80486DX-33 S/N:9214253

Floppy Drive 1: Teac 1.2MB S/N:7388816

Hard Drive 1: Conner 170MB S/N:AMD7CPG

Tape:

Network Card: SMC 10BNC S/N:D2D062667

Video Card: Cirrus Logic 1MB S/N:045495

Mouse: Microsoft Mouse

Case: Desktop

Hub Location: B10

Ram (MB): 8

Floppy Drive 2: Teac 1.44MB S/N:M746806

Hard Drive 2:

I/O Card: IDE-GoldStar S/N:9314495

Network Address:

Monitor: ADI ProVista SVGA S/N:N3284

Keyboard: Focus 2001 S/N:940104887

Computer Location: Client Services

Network Wire: 012

Motherboard: 80486DX2-66

Floppy Drive 1: TEAC 1.2 MB B290866

Hard Drive 1: WD 200 MB WT2692016573

Tape:

Network Card: MultiTech EN301T16

Video Card: Trident 1 MB VLB VGA GR6Z435Q00740

Mouse: Microsoft Mouse 2049860

Case: Desktop

Hub Location: M9

Ram (MB): 8

Floppy Drive 2: TEAC 1.44 MB W595847

Hard Drive 2:

I/O Card: VLE IDE 9316598

Network Address:

Monitor: ADI 3G D46555550148780

Keyboard: Keytronic

300522

ENVIROTECH RESEARCH, INC.

Computer Location: Data Room - Black and White X-Terminal

Network Wire: D4	Hub Location: M8
Motherboard: B/W RISC X-Terminal S/N:0692L101491	Ram (MB): 4
Floppy Drive 1:	Floppy Drive 2:
Hard Drive 1:	Hard Drive 2:
Tape:	I/O Card: NCD
Network Card: NCD	Network Address:
Video Card: NCD	Monitor: NCD19RP3TW S/N:30-221520
Mouse: Logitech M-CE-15-9F-NCD S/N:LT202C0	Keyboard: NCD N-97 0600023 S/N:SC212
Case: Desktop	

Computer Location: Data Room - General PC

Network Wire: D6	Hub Location: T8
Motherboard: 80486DX-33 S/N:0906034	Ram (MB): 8
Floppy Drive 1: Teac 5.25 S/N:L857317	Floppy Drive 2: Teac 3.5 S/N:5580607
Hard Drive 1: Conner 120MB S/N:NBRT81	Hard Drive 2: Conner 120MB S/N:NB87KP
Tape:	I/O Card: Generic S/N:9203595
Network Card: SMC 8013WC S/N:02A298751	Network Address: 0000C0CFA95
Video Card: Trident 1MB SVGA S/N:8127074	Monitor: ViewSonic 4E S/N:3314835464
Mouse: Kensington Expert S/N:296323	Keyboard: Fujitsu FKB4700 S/N:H2395496
Case: Mid-Tower	

300523

ENVIROTECH RESEARCH, INC.

Computer Location: Data Room - HP730

Network Wire: UNX

Hub Location: M9

Motherboard: HP PA-RISC 730

Ram (MB): 32

Floppy Drive 1:

Floppy Drive 2:

Hard Drive 1: HP 420 MB

Hard Drive 2: HP 1.3 GB External Tower

Tape:

I/O Card:

Network Card: HP Ethernet

Network Address:

Video Card: HP Mono Graphics

Monitor: HP

Mouse: HP

Keyboard: HP

Case: Desktop

Computer Location: Data Room - Novell Server

Network Wire: SRV

Hub Location: T11

Motherboard: 80386DX-33

Ram (MB): 8

Floppy Drive 1: 5.25 HD

Floppy Drive 2: 3.5 HD

Hard Drive 1: 312 MB

Hard Drive 2: 312 MB

Tape:

I/O Card:

Network Card: MultiTech S/N:100317

Network Address:

Video Card:

Monitor: GoldStar Monochrome

Mouse:

Keyboard:

Case:

300524

ENVIROTECH RESEARCH, INC.

Computer Location: Data Room - Programmer/Analyst

Network Wire: D3

Hub Location: M4

Motherboard: 80486DX-33

Ram (MB): 20

Floppy Drive 1: Teac 5.25 S/N:N676255

Floppy Drive 2: Teac 3.5 S/N:8455806

Hard Drive 1: WD Caviar 2200 212 MB S/N:WT254178

Hard Drive 2:

Tape: Colorado 120MB S/N:AAA0049395

I/O Card: Colorado Floppy Tape Adapter

Network Card: SMC 8013WC S/N:02A307942

Network Address: 0000C042CE5

Video Card: Trident 1MB SVGA S/N:81B7070

Monitor: Sceptre CMGD S/N:228DW000

Mouse: Microsoft Mouse S/N:0011243

Keyboard: Fujitsu FKB4700 S/N:H835988

Case: Mid-Tower

Computer Location: Decomissioned - BNA 3 Lab

Network Wire:

Hub Location:

Motherboard: 80286 S/N:8805049082

Ram (MB): 1

Floppy Drive 1: 5.25 S/N:FD0113324

Floppy Drive 2:

Hard Drive 1: Generic S/N:251-M1C2

Hard Drive 2:

Tape:

I/O Card: Generic S/N:NDC5425

Network Card: Western Digital S/N:085172

Network Address:

Video Card: Generic

Monitor: Sceptre S/N:GKR66206B

Mouse:

Keyboard: Arche Technologies S/N:73544

Case:

300525

ENVIROTECH RESEARCH, INC.

Computer Location: Lab Manager

Network Wire: O1

Motherboard: 80486-DX66 S/N:F93043391

Floppy Drive 1: Teac 5.25 S/N:X654790

Hard Drive 1: Caviar 2200 220MB S/N:99-00411-002

Tape:

Network Card: SMC 8013 WC

Video Card: Trident 1MB SVGA S/N:9317405

Mouse: Microsoft Mouse S/N:0028367

Case: Mid-Tower

Hub Location: M2

Ram (MB): 16

Floppy Drive 2: Teac 3.5 S/N:E482391

Hard Drive 2:

I/O Card: PT-604A S/N:9314638

Network Address: 0000C041CE5

Monitor: ADI MicroScan 3e+ S/N:560500

Keyboard: Fujitsu FKB4700 S/N:H274588

Computer Location: Mail Room

Network Wire: O14

Motherboard: 80486DX-33

Floppy Drive 1: Teac 5.25 S/N:G991119

Hard Drive 1: 170 MB Connor

Tape:

Network Card: SMC Ethernet

Video Card: Cirrus Logic 1 Mb

Mouse: Microsoft Mouse

Case: Desktop

Hub Location: B12

Ram (MB): 8

Floppy Drive 2: Teac 3.5 S/N:G991116

Hard Drive 2:

I/O Card: Generic S/N:9103776

Network Address: 000800100344

Monitor: ViewSonic 2 S/N:1410512990P

Keyboard: Chicony S/N:003013152

300526

ENVIROTECH RESEARCH, INC.

Computer Location: Metals AA #1

Network Wire: L4

Motherboard: 80486DX-33

Floppy Drive 1: Teac 5.25 S/N:N626235

Hard Drive 1: Conner S/N:AB73MBW

Tape:

Network Card: MultiTech S/N:100809

Video Card: Paradise VGA S/N:20229802

Mouse: Kensington Expert S/N:294886

Case: Tower

Hub Location: T7

Ram (MB): 1

Floppy Drive 2: Teac 3.5 S/N:5993703

Hard Drive 2:

I/O Card: Generic S/N:190458

Network Address:

Monitor: ViewPerfect S/N:1104214572

Keyboard: Keytronic FT11 S/N:0188276

Computer Location: Metals AA #2

Network Wire: L5

Motherboard: 80486DX-33 S/N:0906023

Floppy Drive 1: Teac 5.25 S/N:W797349

Hard Drive 1: Conner WD 2120 S/N:WT231370924

Tape:

Network Card: MultiTech S/N:100318

Video Card: Paradise VGA S/N:20207218

Mouse: Kensington Expert Mouse S/N:293017

Case: Mid-Tower

Hub Location: T15

Ram (MB): 1

Floppy Drive 2: Teac 3.5 S/N:2106120

Hard Drive 2:

I/O Card:

Network Address:

Monitor: ViewSonic 1 S/N:1620789681P

Keyboard: Fujitsu FKB4700 S/N:GY34991

300527

ENVIROTECH RESEARCH, INC.

Computer Location: Metals ARL-ICP

Network Wire: L3

Motherboard: 80386SX-16 S/N:78492

Floppy Drive 1: Teac 3.5

Hard Drive 1: 120MB

Tape:

Network Card: MultiTech S/N:100316

Video Card: Generic

Mouse:

Case: Desktop

Hub Location:

Ram (MB): 2

Floppy Drive 2: Teac 5.25

Hard Drive 2:

I/O Card: Generic S/N:KW182672

Network Address:

Monitor: Taxan 770 S/N:K1A592045

Keyboard: Keytronics S/N:0274044

Computer Location: Metals Office

Network Wire: L6

Motherboard: 80486-DX33 S/N:0906039

Floppy Drive 1: Teac 5.25 S/N:L857316

Hard Drive 1: Conner 120MB S/N:NDC7DC

Tape: Colorado Jumbo 120

Network Card: SMC 8013WC S/N:61-600406-005

Video Card: Trident 1MB SVGA S/N:8127068

Mouse: Kensington Expert Mouse S/N:289464

Case:

Hub Location: B11

Ram (MB): 8

Floppy Drive 2: Teac 3.5 S/N:5580606

Hard Drive 2:

I/O Card: Generic S/N:188197

Network Address: 0000C076A24

Monitor: ViewSonic 4E S/N:3314835462

Keyboard: Fujitsu FKB4700 S/N:H239594

300528

ENVIROTECH RESEARCH, INC.

Computer Location: Metals Prep Lab

Network Wire: L1

Motherboard: 80386SX-16

Floppy Drive 1: 5.25

Hard Drive 1: 120MB

Tape:

Network Card: MultiTech

Video Card: Generic

Mouse: City Mouse

Case:

Hub Location:

Ram (MB): 2

Floppy Drive 2: 3.5

Hard Drive 2:

I/O Card:

Network Address:

Monitor: Samsung SyncMaster 3

Keyboard:

Computer Location: Metals TJA-ICP

Network Wire:

Motherboard: 80386DX-33

Floppy Drive 1: TEAC 5 1/4 G991119

Hard Drive 1: LODJ77 80 Mb

Tape:

Network Card: SMC Ethernet

Video Card: Generic S/N:AT10-10C

Mouse: Microsoft Mouse

Case:

Hub Location:

Ram (MB): 4

Floppy Drive 2: TEAC 5 1/4 G991116

Hard Drive 2:

I/O Card:

Network Address:

Monitor: ViewSonic

Keyboard: Fujitsu FKB4700 S/N:GY34997

300529

ENVIROTECH RESEARCH, INC.

Computer Location: MIS Manager's Office (SCOSYSV)

Network Wire: 08	Hub Location: M6
Motherboard: Pentium 90 - Dual Processor	Ram (MB): 32
Floppy Drive 1: Teac 3.5 S/N:F795986	Floppy Drive 2:
Hard Drive 1: Micropolis 2112 1.2GB S/N:3045212091	Hard Drive 2:
Tape: Archive Python 2GB 4mm DAT	I/O Card: Generic S/N:9309118
Network Card: Racor-Datcom ES3210 S/N:243M3733	Network Address:
Video Card: Trident 1MB SVGA S/N:9215648	Monitor: ADI Microscan 3E+ S/N:560500
Mouse: Microsoft Bus Mouse 0016199	Keyboard: Fujitsu FKB4700 S/N:H274693
Case: Full Tower	

Computer Location: MIS Manager's Office PC

Network Wire: 09	Hub Location: M7
Motherboard: Gateway 200 P5-66 Pentium	Ram (MB): 16
Floppy Drive 1: 3 1/2 - Gateway	Floppy Drive 2:
Hard Drive 1: 520 MB - Connor	Hard Drive 2: 440 MB - Connor
Tape: Double Speed CD-ROM	I/O Card:
Network Card: SMC Ethernet	Network Address:
Video Card: PCI Diamond Stealth 2 MB	Monitor: Gateway 2000 - 1572
Mouse: Microsoft Keyboard Mouse	Keyboard: Gateway 2000 AnyKey
Case: Gateway Desktop	

300530

ENVIROTECH RESEARCH, INC.

Computer Location: Pest/PCB Office - HP710

Network Wire: L17	Hub Location: M1
Motherboard: HP PA-RISC 9000/710 S/N:6216A00472	Ram (MB): 32
Floppy Drive 1: 3.5 High Density	Floppy Drive 2:
Hard Drive 1: 330 MB SCSI	Hard Drive 2: 1.3GB SCSI S/N:3212E00593
Tape: 1.3GB 4mm DAT S/N:3141A01704	I/O Card:
Network Card: HP Ethernet w/ Transceiver	Network Address:
Video Card: HP	Monitor: HP 98774B S/N:320T1308
Mouse: HP 46060B S/N:314750035	Keyboard: HP C1429A #ABA S/N:3147501
Case: Desktop	

Computer Location: Pest/PCB Office PC

Network Wire: 02	Hub Location: T2
Motherboard: 80386DX-25 S/N:MB0102793	Ram (MB): 5
Floppy Drive 1: Teac 5.25 S/N:48001364	Floppy Drive 2: Teac 3.5 S/N:633740
Hard Drive 1: Micropolis 86MB S/N:084745	Hard Drive 2:
Tape:	I/O Card:
Network Card: SMC S/N:61-600406-015	Network Address: 0000C07BA24
Video Card: Paradise OEM VGA S/N:1134865	Monitor: ViewSonic 2V S/N:110421458
Mouse: Kensington Expert S/N:300470	Keyboard: Keytronic FT11 s/N:0273031
Case: Desktop	

300531

ENVIROTECH RESEARCH, INC.

Computer Location: Pesticide Lab GC #1

Network Wire: L11	Hub Location: M5
Motherboard: 80486DX-33 S/N:A1025	Ram (MB): 8
Floppy Drive 1: 5.25 S/N:L458691	Floppy Drive 2: 3.5 S/N:5380052
Hard Drive 1: Conner S/N:N88E1W	Hard Drive 2:
Tape:	I/O Card:
Network Card: SMC S/N:D28062214	Network Address:
Video Card:	Monitor: ViewSonic 4E
Mouse: Kensington	Keyboard: Fujitsu FKB4700
Case: Mid-Tower	

Computer Location: Pesticide Lab GC #2

Network Wire: L12	Hub Location: T12
Motherboard: 80486DX-33 S/N:A1025190	Ram (MB): 8
Floppy Drive 1: 5.25 HD S/N:19307351-49	Floppy Drive 2: 3.5 HD S/N:19307332-40
Hard Drive 1: Western Digital 125MB S/N:99-004085-0	Hard Drive 2: 19307332-40
Tape:	I/O Card:
Network Card: SMC Plus S/N:61-600406-004	Network Address:
Video Card: Trident TVGA S/N:143149	Monitor: ViewSonic 4E S/N:3314835479
Mouse:	Keyboard:
Case:	

300532

ENVIROTECH RESEARCH, INC.

Computer Location: Pesticide Lab GC #3

Network Wire: L16	Hub Location: M5
Motherboard: 80486DX33 S/N:91410957	Ram (MB): 8
Floppy Drive 1: Teac 5.25 HD S/N:W052072	Floppy Drive 2: Teac 3.5 HD S/N:7474655
Hard Drive 1: Conner CP301044 S/N:AB7396J	Hard Drive 2:
Tape:	I/O Card:
Network Card: SMC Ethernet S/N:K1A10749	Network Address:
Video Card: Generic S/N:81A1343	Monitor: ViewSonic 4E S/N:3821235564
Mouse: Kensington S/N:342372	Keyboard: Fujitsu FKB4700 S/N:46427977
Case: Mid-Tower	

Computer Location: President's Office

Network Wire: 03	Hub Location: B6
Motherboard: 80486DX2-66 S/N:T90004	Ram (MB): 16
Floppy Drive 1: Teac 5.25 S/N:L856034	Floppy Drive 2: Teac 3.5 S/N:5573829
Hard Drive 1: L0DJ77 S/N:9105918 120 MB	Hard Drive 2:
Tape:	I/O Card:
Network Card: SMC	Network Address: 0000C0FC637
Video Card: Expert SVGA S/N:20113064	Monitor: Viewsonic 1 S/N:1621772971P
Mouse: Microsoft Mouse	Keyboard: Fujitsu FKB4700 S/N:H2395391
Case: Mid-Tower	

300533

ENVIROTECH RESEARCH, INC.

Computer Location: Reception Area - Print Server

Network Wire: D2	Hub Location: M10
Motherboard: 80386SX-25	Ram (MB): 0
Floppy Drive 1: Teac 5.25 S/N:L778172	Floppy Drive 2:
Hard Drive 1:	Hard Drive 2:
Tape:	I/O Card: Generic S/N:KT0193789
Network Card: MultiTech S/N:100330	Network Address: 000800100856
Video Card: Generic S/N:9101039	Monitor: Samsung MA2565 S/N:HSRAC
Mouse:	Keyboard: AST ASTKB101 S/N:200910
Case: Desktop	

Computer Location: Receptionist

Network Wire: 04	Hub Location: T5
Motherboard: 80486DX-33	Ram (MB): 8
Floppy Drive 1: Teac 5.25 S/N:6991117	Floppy Drive 2: Chinon 5.25 S/N:20252154
Hard Drive 1: Seagate ST351A 40MB S/N:913001-305	Hard Drive 2:
Tape:	I/O Card: Generic S/N:9103709
Network Card: MultiTech S/N:100395	Network Address: 000800100395
Video Card: Western Digital VGA S/N:541762	Monitor: ViewSonic 2 S/N:1410512985P
Mouse:	Keyboard: Chicony S/N:910311547
Case: Desktop	

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ENVIROTECH RESEARCH, INC.

Computer Location: Sample Receiving

Network Wire: L2	Hub Location: M3
Motherboard: 80486DX-33 S/N:9310685	Ram (MB): 8
Floppy Drive 1: Teac 5.25 S/N:W194480	Floppy Drive 2: Teac 3.5 S/N:E308975
Hard Drive 1: Conner 170MB S/N:AMBBE13	Hard Drive 2:
Tape:	I/O Card: PT-604A S/N:9310662
Network Card: SMC 8013WC S/N:K1A592042	Network Address:
Video Card: Trident 1MB SVGA S/N:9345953	Monitor: ADI MicroScan 3E+ S/N:01256
Mouse: Microsoft Mouse S/N:0255723	Keyboard: Keytronic KT2000 S/N:C932035
Case: Mid-Tower	

Computer Location: Technical Director's Office

Network Wire: 06	Hub Location: B5
Motherboard: Zeos Laptop 80486SLC25 MHz	Ram (MB): 8
Floppy Drive 1: 3.5 internal	Floppy Drive 2:
Hard Drive 1: internal	Hard Drive 2:
Tape:	I/O Card:
Network Card: GVC Pocket Adapter	Network Address:
Video Card: Zeos	Monitor: ADI ProVista
Mouse: Logitech Portable Trackman	Keyboard: Zeos
Case: Laptop - Zeos	

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ENVIROTECH RESEARCH, INC.

Computer Location: Vice President's Office

Network Wire: 05

Motherboard: 80386DX-40 S/N:9207730

Floppy Drive 1: Teac 5.25 S/N:Q742732

Hard Drive 1: WD Caviar 2120 120MB S/N:WT256121

Tape:

Network Card: SMC

Video Card: Cirrus SVGA S/N:Q212256

Mouse: Kensington Expert Mouse S/N:323728

Case: Low Tower

Hub Location: B9

Ram (MB): 8

Floppy Drive 2: Teac 3.5 S/N:9107930

Hard Drive 2:

I/O Card:

Network Address:

Monitor: ViewSonic 1 S/N:1623083775P

Keyboard: Fujitsu FKB4700 S/N:4955659

Computer Location: VOA 12 Lab

Network Wire: L8

Motherboard: MultiTech S/N:A0326487-E

Floppy Drive 1: 5.25 S/N:FD-556FR-633-0

Hard Drive 1: Seagate S/N:00481520

Tape:

Network Card: Novell S/N:738-000220-001

Video Card: Generic S/N:59-6672-00A1

Mouse:

Case: MultiTech S/N:A052008159

Hub Location: T11

Ram (MB): 1

Floppy Drive 2:

Hard Drive 2:

I/O Card: Generic S/N:61-000107-00

Network Address:

Monitor: NEC APC-H530 S/N:A3D5YR

Keyboard: Generic S/N:0274042

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ENVIROTECH RESEARCH, INC.

Computer Location: VOA 34 Lab

Network Wire: L10

Motherboard: IBM PS/2 Model 50 S/N:72-8247390

Floppy Drive 1: IBM 40 MB

Hard Drive 1: IBM 3.5

Tape:

Network Card: Western Digital S/N:800f240E26

Video Card:

Mouse:

Case: Desktop

Hub Location: T14

Ram (MB):

Floppy Drive 2:

Hard Drive 2:

I/O Card:

Network Address:

Monitor: ViewSonic 2V S/N:1104214596

Keyboard: IBM S/N:2584867

Computer Location: VOA GC #1

Network Wire: L15

Motherboard: 80486DX-33

Floppy Drive 1: 5.25 FD

Hard Drive 1: 120 MB

Tape:

Network Card: SMC Ethernet

Video Card: SVGA

Mouse: Kensington Expert Mouse

Case: Mid-Tower

Hub Location: B8

Ram (MB): 8

Floppy Drive 2: 3.5 FD

Hard Drive 2:

I/O Card:

Network Address:

Monitor: ViewSonic 4E

Keyboard:

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ENVIROTECH RESEARCH, INC.

Computer Location: VOA GC #2

Network Wire: L13	Hub Location: B12
Motherboard: 80486DX-33 S/N:A1039908	Ram (MB): 8
Floppy Drive 1: Teac 5.25 S/N:M905314	Floppy Drive 2: Teac 3.5 S/N: 7489733
Hard Drive 1: Conner S/N:BP06327	Hard Drive 2:
Tape:	I/O Card: IEEE Card S/N:3009
Network Card: 8013WC	Network Address: 0000C0FF637
Video Card: Generic S/N:81A1320	Monitor: ViewSonic 4E
Mouse: Kensington Expert Mouse S/N:305545	Keyboard: Fujitsu FKB4700 S/N:H5417081
Case: Mid-Tower	

Computer Location: VOA GC - Grayscale X-Terminal

Network Wire: L19	Hub Location: T5
Motherboard: RISC X-Terminal S/N:0592K100746	Ram (MB): 4
Floppy Drive 1:	Floppy Drive 2:
Hard Drive 1:	Hard Drive 2:
Tape:	I/O Card: NCD
Network Card: NCD	Network Address:
Video Card: NCD	Monitor: NCD BDC1107 S/N:21300038
Mouse: Logitech M-CE-15-9F-NCD S/N:LT112R0	Keyboard: NCD 9100044 S/N:C0121743
Case: Desktop	

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ENVIROTECH RESEARCH, INC.

Computer Location: VOA/BNA Office

Network Wire: 013

Motherboard: 80486DX-33 S/N:9310686

Floppy Drive 1: Teac 5.25 S/N:R167003

Hard Drive 1: Conner 170MB S/N:AMBT3K1

Tape:

Network Card: SMC 8013WC S/N:K1A592044

Video Card: Trident 1MB SVGA S/N:9346139

Mouse: Microsoft Mouse S/N:0500112

Case: Mid-Tower

Hub Location: B3

Ram (MB): 4

Floppy Drive 2: Teac 3.5 S/N:E308974

Hard Drive 2:

I/O Card: DT-604A S/N:9310663

Network Address: 0000C079A24

Monitor: ADI Microscan 3E+ S/N:027560

Keyboard: Keytronics KT2000 S/N:C93203

Computer Location: Wet Chem Lab

Network Wire: L14

Motherboard: 80486-DX33

Floppy Drive 1: Teac 5.25 S/N:E132878

Hard Drive 1: WD Caviar 2120 120MB S/N:WR316078

Tape:

Network Card: SMC 8013WC

Video Card: Trident 1MB S/N:WBD334608705

Mouse: Kensington Expert Mouse

Case: Desktop

Hub Location: B7

Ram (MB): 8

Floppy Drive 2:

Hard Drive 2:

I/O Card:

Network Address: 0000C072A24

Monitor: ViewSonic 1 S/N:1621067218D

Keyboard: Keytronic FT15 S/N:D27Y042

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